

ENVIRONMENTAL MANAGEMENT PROGRAMME

THE PROPOSED NORTHERN BULK DISTRIBUTION PIPELINE, MANGAUNG METROPOLITAN MUNICIPALITY, FREE STATE PROVINCE.



Environmental Management Group (Pty) Ltd

Specialists in Environmental Management Integrating Industry and Infrastructure with the Environment

Prepared For:

BVi Consulting (Pty) Ltd.

Prepared By:

Environmental Management Group (Pty) Ltd

Contact Person(s):

F.J. Coetzee: francois@envmgrp.com

CW Vermeulen: cwv@envmgrp.com

ENVIRONMENTAL MANAGEMENT PROGRAMME

in terms of the

National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended &
Environmental Impact Assessment Regulations 2014

Submitted for:

Stakeholder Review & Comment



This report is the property of the Author/Company, who may publish it, in whole, provided that:



Written approval is obtained from the Author and that *EMG* is acknowledged in the publication;



EMG is indemnified against any claim for damages that may result from any publication of specifications, recommendations or statements that is not administered or controlled by *EMG*;



The contents of this report, including specialist/consultant reports, may not be used for purposes of sale or publicity or advertisement without the prior written approval of *EMG*;



EMG accepts no responsibility for the Applicant/Client for failure to follow or comply with the recommended programme, specifications or recommendations contained in this report;



EMG accepts no responsibility for deviation or non-compliance of any specifications or recommendations made by specialists or consultants whose input/reports are used to inform this report; and



All figures, plates and diagrams are copyrighted and may not be reproduced by any means, in any form, in part or whole without prior written approval from *EMG*.

Prepared By:

Environmental Management Group (Pty) Ltd

P.O. Box 37473

Langenhoven Park, 9330

Tel: 051 412 6350

Fax: 086 556 2125

Contact Person(s):

F.J. Coetzee: francois@envmgrp.com

CW Vermeulen: cwv@envmgrp.com

TABLE OF CONTENTS:

TABLE OF CONTENTS:	3
APPENDICES	4
FIGURES	4
TABLES	4
LIST OF ACRONYMS AND ABBREVIATIONS	4
DEFINITIONS:	5
1. INTRODUCTION AND BACKGROUND:	7
1.1. SCOPE:	7
1.2. LEGAL REQUIREMENTS OF AN EMPr.....	8
1.3. RELEVANT LEGISLATION:	9
2. PROJECT DESCRIPTION:	12
2.1. BACKGROUND:	12
2.2. LOCATION:	12
2.1. PROJECT COMPONENTS:	12
2.2. RECEIVING ENVIRONMENT:	17
2.3. SOCIO-ECONOMIC BENEFITS	17
2.4. SPECIALIST STUDIES	17
3. ROLE PLAYERS AND RESPONSIBILITY MATRIX:	18
4. PROJECT PHASING	21
4.1. PLANNING AND FINAL DESIGN PHASE	21
4.2. PRE-CONSTRUCTION	21
4.3. CONSTRUCTION	22
4.4. OPERATION	23
5. OBJECTIVES OF THE EMPr:	24
6. IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS:	24
7. LEGAL REQUIREMENTS:	27
7.1. GENERAL:	27
7.2. STATUTORY AND OTHER APPLICABLE LEGISLATION:	27
7.3. ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS	27
7.4. TRAINING	29
7.5. RECORD KEEPING:	29
7.6. COMPLIANCE AND PENALTIES:	29
7.7. REPORT AVAILABILITY:	30
8. ENVIRONMENTAL MITIGATION SPECIFICATIONS FOR IMPACTS:	31
8.1. DESIGN PHASE	31
8.2. SITE ESTABLISHMENT	32
8.3. SOCIAL ENVIRONMENTAL ISSUES:	35
8.4. HANDLING OF EMERGENCIES	39
8.5. CLEARING AND GRUBBING	41
8.6. STOCKPILE AND SOIL MANAGEMENT	44

8.7.	EROSION & SEDIMENT MANAGEMENT	48
8.8.	SURFACE & GROUND WATER QUALITY	51
8.9.	ALTERING & IMPEDING WATERCOURSES	57
8.10.	FUANA & FLORA MANAGEMENT	62
8.11.	WASTE MANAGEMENT	69
8.12.	AIR QUALITY, NOISE & VIBRATION MANAGEMENT	74
8.13.	CONTAMINATION OF THE ENVIRONMENT	80
8.14.	ARCHAEOLOGICAL & HERITAGE MANAGEMENT	86
8.15.	REHABILITATION AND SITE CLOSURE	92
9.	METHOD STATEMENTS:	98

APPENDICES

APPENDIX A: EAP CV

APPENDIX B: MAPS

APPENDIX C: CHANCE FIND PROTOCOL

FIGURES

FIGURE 1:	PROPOSED PIPELINE ROUTE.	13
FIGURE 2:	PROPOSED PIPELINE CROSSING OF THE N1.	14
FIGURE 3	THE LOCALITY MAP OF THE PROPOSED DEVELOPMENT.	15
FIGURE 4	LAYOUT MAP OF THE PROPOSED DEVELOPMENT.	16
FIGURE 5	EASILY RECOGNISABLE FEATURES LIKELY INDICATIVE OF FOSSIL REMAINS WITHIN ADELAIDE SUBGROUP SEDIMENTARY ROCKS MAY INCLUDE FRAGMENTARY SILICIFIED WOOD RESEMBLING STONE-LIKE OBJECTS OF VARIABLE SIZE EXHIBITING CONCENTRIC RING-LIKE STRUCTURES IN DISTAL OR PROXIMAL VIEW (FAR LEFT), AND FOSSIL BONES RESEMBLING ODD-SHAPED, NODULAR OR CYLINDRICAL, STONE-LIKE OBJECTS.	123
FIGURE 6:	SURFACE CONCENTRATIONS OF KNAPPED LITHIC DEBITAGE AND RETOUCED FLAKE TOOLS (A)- INCLUDING CONVERGENT FLAKE-BLADES CONSISTENT WITH MSA TYPOLOGIES (B)- MAY SIGNAL DEFLATED OR SHALLOWLY CAPPED IN SITU STONE AGE OCCURRENCES. LOCALISED SURFACE SCATTERS OF GLASS, FRAGMENTED BONE, AND CORRODED METAL ARTEFACTS ARE DIAGNOSTIC OF LATE 19TH- TO EARLY 20TH-CENTURY REFUSE MIDDENS ASSOCIATED WITH HISTORICAL-PERIOD OCCUPATION. (C)- IN THE ABSENCE OF FORMAL HEADSTONES, UNMARKED BURIAL SITES ARE TYPICALLY IDENTIFIED BY LOW, TIGHTLY PACKED STONE CAIRNS OR DOMED COBBLE COVERINGS, SURFACE FEATURES CONSISTENT WITH HISTORICALLY VERNACULAR GRAVE- MARKING TRADITIONS (D, E).	124

TABLES

TABLE 1	REQUIREMENTS OF AN ENVIRONMENTAL MANAGEMENT PROGRAMME AS DETAILED IN APPENDIX 4 OF THE NEMA EIA REGULATIONS 2014 (AS AMENDED)	8
TABLE 2	RELEVANT LEGISLATION AND ITS APPLICABILITY TO THE DEVELOPMENT	9
TABLE 5	FUNCTIONS AND RESPONSIBILITIES OF PROJECT TEAM	18
TABLE 6	POTENTIAL ANTICIPATED IMPACTS OF THE DEVELOPMENT ON THE ENVIRONMENT.	25

LIST OF ACRONYMS AND ABBREVIATIONS

AIS	Alien and Invasive Species
BA	Basic Assessment (as provided for in NEMA (Act 107 of 1998) and EIA Regulations [2014])
BAR	Basic Assessment Report
CA	Competent Authority
DEA	Department of Environmental Affairs

DESTEA	Department of Economic, Small Business Development, Tourism and Environmental Affairs (Free State)
DFFE	Department of Forestry, Fisheries and the Environment
DM	District Municipality
DMRE	Department of Mineral Resources and Energy
DWS	Department of Water and Sanitation
EA	Environmental Authorisation
EAP	Environmental Assessment Practitioner
ECO	Environmental Control Officer
EI	Ecological Importance
EIA	Environmental Impact Assessment
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Ecological Support Area (Biodiversity)
ESA	Early Stone Age (Heritage)
EWT	Endangered Wildlife Trust
FSPHRA	Free State Provincial Heritage Resources Authority
GN	Government Notice
GBWSS	Greater Bloemfontein Water Supply System
I&APs	Interested and Affected Parties
MMM	Mangaung Metropolitan Municipality
MSA	Middle Stone Age
NCW	Not Conservation Worthy
NEMA	National Environmental Management Act (No. 107 of 1998) (as amended)
NFEPA	National Freshwater Ecosystems Priority Areas
NHRA	National Heritage Resources Act (No. 25 of 1999)
NPAES	National Protected Areas Expansion Strategy
NWA	National Water Act (Act 36 of 1998)
NWI	National Wetland Inventory
PES	Present Ecological State
PPP	Public Participation Process
QDA	Quaternary Drainage Area
RDL	Red Data Listed
SACNASP	South African Council for Natural Scientific Professions
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SE	Site Engineer
SEI	Site Ecological Importance
SIP	Strategic Integrated Projects
SPV	Special Purpose Vehicle
ToR	Terms of Reference
WMA	Water Management Area
WTW	Water Treatment Works
WTW	Water Treatment Plant
WULA	Water Use License Application

DEFINITIONS:

1. **Alien Vegetation:** alien vegetation is defined as undesirable plant growth which shall include, but not be limited to; all declared category 1 and 2 listed invader species as set out in the Conservation of Agricultural Resources Act (CARA) regulations. Other vegetation deemed to be alien shall be those plant species that show the potential to occupy in number, any area within the defined construction area and which are declared to be undesirable.
2. **Aspect:** Element of an organisation's activities, products or services that can interact with the environment.

3. **Auditing:** A systematic, documented, periodic and objective evaluation of how well the environmental management plan is being implemented and is performing with the aim of helping to safeguard the environment by: facilitating management control which would include meeting regulatory requirements. Results of the audit help the organisation to improve its environmental policies and management systems.
4. **Built environment:** Physical surroundings created by human activity, e.g. buildings, houses, roads, bridges and harbours.
5. **Contamination:** Polluting or making something impure.
6. **Corrective (or remedial) action:** Response required addressing an environmental problem that is in conflict with the requirements of the EMPR. The need for corrective action may be determined through monitoring, audits or management review.
7. **Degradation:** The lowering of the quality of the environment through human activities, e.g. river degradation, soil degradation.
8. **Ecology:** The scientific study of the relationship between living things (animals, plants and humans) and their environment.
9. **Ecosystem:** The relationship and interaction between plants, animals and the non-living environment.
10. **Environment:** environment means the surroundings within which humans exist and that could be made up of -
 - 10.1. the land, water and atmosphere of the earth;
 - 10.2. micro-organisms, plant and animal life;
 - 10.3. any part or combination of (10.1) and (10.2) and the interrelationships among and between them; and
 - 10.4. the physical, chemical, aesthetic and cultural properties and conditions of the foregoing that influence human health and well-being.
11. **Environmental aspect:** an environmental aspect is any component of a contractor's construction activity that is likely to interact with the environment.
12. **Environmental impact:** an impact or environmental impact is the change to the environment, whether desirable or undesirable, that will result from the effect of a construction activity. An impact may be the direct or indirect consequence of a construction activity.
13. **Environmental authorisation:** an environmental authorisation is a written statement from the Department of Economic, Small Business Development, Tourism and Environmental Affairs (DESTEA) that records its approval of a planned development.
14. **Hazardous waste:** Waste, even in small amounts that can cause damage to plants, animals, their habitat and the well-being of human beings, e.g. waste from factories, detergents, pesticides, hydrocarbons, etc.
15. **Land use:** The use of land for human activities, e.g. residential, commercial, industrial use.
16. **Mitigation:** Measures designed to avoid, reduce or remedy adverse impacts.

1. INTRODUCTION AND BACKGROUND:

1.1. SCOPE:

Environmental Management Group (Pty) Ltd has been appointed by **BVi Consulting Engineers Central (Pty) Ltd (Consulting Engineer)**, on behalf of **Mangaung Metropolitan Municipality (the Applicant)**, as the independent Environmental Assessment Practitioner (EAP) to undertake the Basic Assessment (BA) process for the proposed construction of a Bulk Water Distribution Pipeline within the Free State Province. The BA process is being conducted in accordance with the requirements of the Environmental Impact Assessment Regulations, 2014 (as amended), promulgated under the National Environmental Management Act, 1998 (Act No. 107 of 1998).

This document is compiled in accordance with the Integrated Environmental Management (IEM) philosophy, which aims to achieve a desirable balance between conservation and development (DEAT, 1992). IEM is a key instrument of the National Environmental Management Act [NEMA] (Act No. 107 of 1998). NEMA promotes integrated environmental management of activities that may have a significant environmental impact, while IEM prescribes a methodology to ensure that environmental management principles are fully integrated across all stages of the development process. It advocates the use of several environmental management tools that are appropriate for the various levels of decision-making. One such tool is an Environmental Management Programme (EMPr). The IEM guidelines encourage a pro-active approach to sourcing, collating and presenting information in a manner that can be interpreted at all levels. The basic principles underpinning IEM are that there be:

-  informed decision-making;
-  accountability for information on which decisions are taken;
-  accountability for decisions taken;
-  a broad meaning given to the term environment (i.e. one that includes physical, biological,
-  social, economic, cultural, historical and political components);
-  an open, participatory approach in the planning of proposals;
-  consultation with interested and affected parties;
-  due consideration of alternative options;
-  an attempt to mitigate negative impacts and enhance positive aspects of proposals;
-  an attempt to ensure that the 'social costs' of development proposals (those borne by society, rather than the developers) be outweighed by the 'social benefits' (benefits to society as a result of the actions of the developers);
-  democratic regard for individual rights and obligations;
-  compliance with these principles during all stages of the planning, implementation and decommissioning of the proposals (i.e. from 'cradle to grave');
-  and the opportunity for public and specialist input in the decision-making process.

The Environmental Impact Assessment Regulations, which took effect in December 2014, regulate the procedures and criteria for the submission, processing, consideration, and decision on applications for environmental authorisation of listed activities.

1.2. LEGAL REQUIREMENTS OF AN EMPr

Appendix 4 of the NEMA Environmental Impact Assessment (EIA) Regulations 2014 (as amended) specifies the requirements of an EMPr. The table below serves as a map of how the requirements detailed in Appendix 4 have been adhered to.

Table 1 Requirements of an Environmental Management Programme as detailed in Appendix 4 of the NEMA EIA Regulations 2014 (as amended)

Requirements	Reference
<i>Details of the Environmental Assessment Practitioner (EAP) who prepared the EMPr and evidence of that EAP's expertise to prepare the EMPr, including a curriculum vitae</i>	APPENDIX A
<i>A detailed description of the aspects of the activity that are covered by the EMPr as identified by the project description.</i>	SECTION 1 & 2
<i>A map at an appropriate scale which superimposes the proposed activity, its associated structures, and infrastructure on the environmental sensitivities of the preferred site, indicating any areas that should be avoided, including buffers.</i>	APPENDIX B
<i>A description of the impact management outcomes, including management statements, identifying the impacts and risks that need to be avoided, managed, and mitigated as identified through the environmental impact assessment process for all phases of the development, including:</i> (i) <i>Planning and design</i> (ii) <i>Pre-construction activities</i> (iii) <i>Construction activities</i> (iv) <i>rehabilitation of the environment,</i> (v) <i>where relevant, operational activities</i> (vi) <i>and if applicable, post-closure</i>	SECTION 6
<i>A description of proposed impact management actions, identifying the specific manner in which the impact management outcomes will be achieved, and must, where applicable, include actions to:</i> (i) <i>avoid, modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation</i> (ii) <i>comply with any prescribed environmental management standards or practices</i> (iii) <i>comply with any applicable provisions of the Act regarding closure, if applicable</i>	SECTION 8
<i>An indication of the persons who will be responsible for the implementation of the impact management actions</i>	SECTION 3 & 8
<i>The time periods within which the impact management actions must be implemented</i>	SECTION 8
<i>The frequency of monitoring the implementation of the impact management actions</i>	SECTION 7 & 8
<i>The mechanism for monitoring compliance with the impact management actions</i>	SECTION 7 & 8
<i>A program for reporting on compliance, taking into account the requirements prescribed by the regulations</i>	SECTION 8
<i>An environmental awareness plan describing the manner in which:</i>	SECTION 7

- i. the applicant intends to inform his or her employees of any environmental risk which may result from their work
- ii. risks must be dealt with in order to avoid pollution or the degradation of the environment

This EMPr addresses the legal requirements outlined in Table 1 above. This document should be considered in an iterative context, permitting amendments throughout the project's lifecycle. Adjustments may be made as new information arises, unforeseen circumstances occur, or as conditions necessitate adaptation.

1.3. RELEVANT LEGISLATION:

There are several legal and policy documents that govern the planning, development, operation, and maintenance of the proposed development. These instruments establish the environmental, water-use, land-use, heritage, and occupational health and safety requirements applicable to the project. An overview of the primary legislation applicable to the project, along with its relevance to the proposed activities, is provided in Table 2 below.

Table 2 Relevant Legislation and its applicability to the development

Listing Notice 1 of the EIA Regulations, 2014, as amended	Description of project activity
Activity 9(i)(ii): <i>The development of infrastructure exceeding 1 000 metres in length for the bulk transportation of water or storm water —</i> <i>(i) with an internal diameter of 0,36 metres or more; or</i> <i>(ii) with a peak throughput of 120 litres per second or more;</i>	The proposed development includes the construction of bulk water distribution infrastructure exceeding 1 000 m in length, with certain pipeline sections having an internal diameter greater than 0.36 m. The internal diameter of the proposed pipelines ranges from approximately 0.25 m to 0.71 m. Pipeline sections exceeding the applicable thresholds of 0.36 m in diameter and 1 000 m in length, and which occur outside of an existing road reserve, are listed below:  New PVC-O 630 mm diameter pipeline (Class 10)  New PVC-O 500 mm diameter pipeline (Class 12.5)  New PVC-O 400 mm diameter pipeline (Class 12.5) In addition, the calculated peak throughput of the proposed bulk water pipeline system is estimated to range between approximately 41.29 litres per second (L/s) and 659.57 L/s, with portions of the system exceeding the 120 L/s threshold stipulated in the activity description. This activity is triggered as it constitutes the development of bulk water transportation infrastructure exceeding 1 000 m in length, with internal pipeline diameters exceeding 0.36 m and peak throughput capacities exceeding 120 L/s.
Activity 19:	The proposed pipeline alignment will directly traverse approximately five non perennial watercourses located

<i>The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;</i>	within the project area. Construction activities associated with the installation of the proposed pipelines, including trench excavation, bedding preparation, backfilling, and the temporary stockpiling and deposition of excavated material, will result in the excavation, removal, movement, and deposition of soil and rock exceeding 10 m³ within the affected watercourses. This listing notice is triggered as the infilling, excavation, removal, or movement of more than 10 m³ of material within a watercourse, as these activities will occur during the construction phase at the identified crossing points. Estimated volume triggered: 1071 m³ Refer to Appendix B for maps indicating the sections of pipe that trigger this activity.
Listing Notice 3 of the EIA Regulations, 2014, as amended	Description of project activity
Activity 12(b)(iv): <i>The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan.</i> b. Free State <i>iv Areas within a watercourse or wetland; or within 100 metres from the edge of a watercourse or wetland.</i>	The proposed development will result in the clearance of indigenous vegetation exceeding 300 m² within identified watercourses and within 100 m of the edge of delineated watercourses associated with the proposed pipeline alignment. Vegetation clearance will be required for construction activities, including site preparation, trench excavation, establishment of temporary working areas, and access along sections of the pipeline route intersecting sensitive riparian and drainage areas. This listing notice is triggered as the applicable listed activity for the clearance of indigenous vegetation within watercourses and regulated buffer areas in the Free State Province, as the extent of vegetation clearance will exceed the 300 m² threshold. Estimated area triggered: 4901 m² Refer to Appendix B for maps indicating the sections of pipe that trigger this activity.
Activity 14(ii)(a)(c)(b)(i)(ff)(hh) : <i>The development of—</i> <i>(ii) infrastructure or structures with a physical footprint of 10 square metres or more</i> <i>Where such development occurs—</i> <i>(a) within a watercourse;</i> <i>(c) if no development setback has been adopted, within 32 metres of a watercourse, measured from the edge of a watercourse;</i> b. Free State <i>i. Outside urban areas:</i> <i>(ff) Critical biodiversity areas or ecosystem service areas as identified in systematic</i>	The proposed pipeline alignment traverses environmentally sensitive areas situated outside of an urban area, including areas identified as Ecological Support Areas (ESA 1 and ESA 2) and a FEPA sub-catchment in applicable biodiversity planning instruments. The development is also located within the prescribed proximity to protected areas, including the Woodland Hills Wildlife Estate and the Dwaal Valley Private Nature Reserve. Estimated area triggered: 595 m² Refer to Appendix B for maps indicating the sections of pipe that trigger this activity.

<i>biodiversity plans adopted by the competent authority or in bioregional plans;</i> <i>(hh) Areas within 10 kilometres from national parks or world heritage sites or 5 kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve;</i>	
--	--

2. PROJECT DESCRIPTION:

2.1. BACKGROUND:

The proposed bulk water pipeline development forms part of a broader regional infrastructure initiative aimed at enhancing bulk water supply capacity, improving system reliability, and ensuring long-term water security within the province. The project specifically seeks to augment the existing bulk distribution network by increasing the conveyance capacity of potable water to the northern extensions of Bloemfontein. These areas are experiencing ongoing residential and commercial expansion, resulting in increased pressure on the existing water supply infrastructure.

2.2. LOCATION:

Project location: The proposed development is located in the Free State Province of South Africa, specifically in the northern extension of Bloemfontein, ward 44. This project falls within the jurisdiction of Mangaung Metropolitan Municipality (MMM). The approximate geographical coordinates of the project site are 29°03'27.9"S latitude and 26°13'47.1"E longitude.

The project lies in close proximity to several key towns and a major city, including:

-  Dewetsdorp is about 80 km to the southeast
-  Dealesville is approximately 70 km to the northwest
-  Wepener is approximately 117 km to the southeast

2.1. PROJECT COMPONENTS:

The proposed infrastructure has been designed to accommodate current and future potable water demands associated with the planned development areas. The system demand parameters are as follows:

-  Annual Average Daily Demand (AADD): 120.19 l/s
-  Gross Annual Average Daily Demand (GAADD): 132.21 l/s
-  Peak Average Daily Demand (PADD): 429.321 l/s
-  Seasonal Peak Average Daily Demand (SPADD): 643.982 l/s (assuming a seasonal peak factor of 1.5)

These demand projections inform the sizing of the pipeline and associated infrastructure to ensure adequate capacity during peak usage periods while maintaining system efficiency and resilience.

The proposed development comprises the construction of a bulk water distribution pipeline with a total length of approximately +-12.7km. The proposed pipeline will comprise varying pipe diameters ranging from 250 mm (inner diameter) to 710 mm (inner diameter) to accommodate the hydraulic and operational requirements along different sections of the

alignment. The variation in pipe diameters is intended to ensure adequate flow capacity, pressure management, and efficient water distribution throughout the system. Estimated pipeline throughput capacities along the alignment are anticipated to range between approximately 41.29 l/s and 659.57 l/s, depending on the specific section and operational demand requirements.

The pipeline will predominantly be installed underground within a trench excavation. Installation depths are expected to vary along the alignment in response to local topography, engineering design specifications, and crossing requirements.

The anticipated burial depths will range from approximately 1 m to 2 m below ground level. Ancillary infrastructure associated with the proposed development includes Isolating Valve Chambers, Air Valve Chambers, Scour Valve Chambers, Pressure Reducing Valve Chamber, and other supporting infrastructure necessary for the operation and maintenance of the bulk water distribution system.



Figure 1: Proposed pipeline route.



Figure 2: Proposed pipeline crossing of the N1.

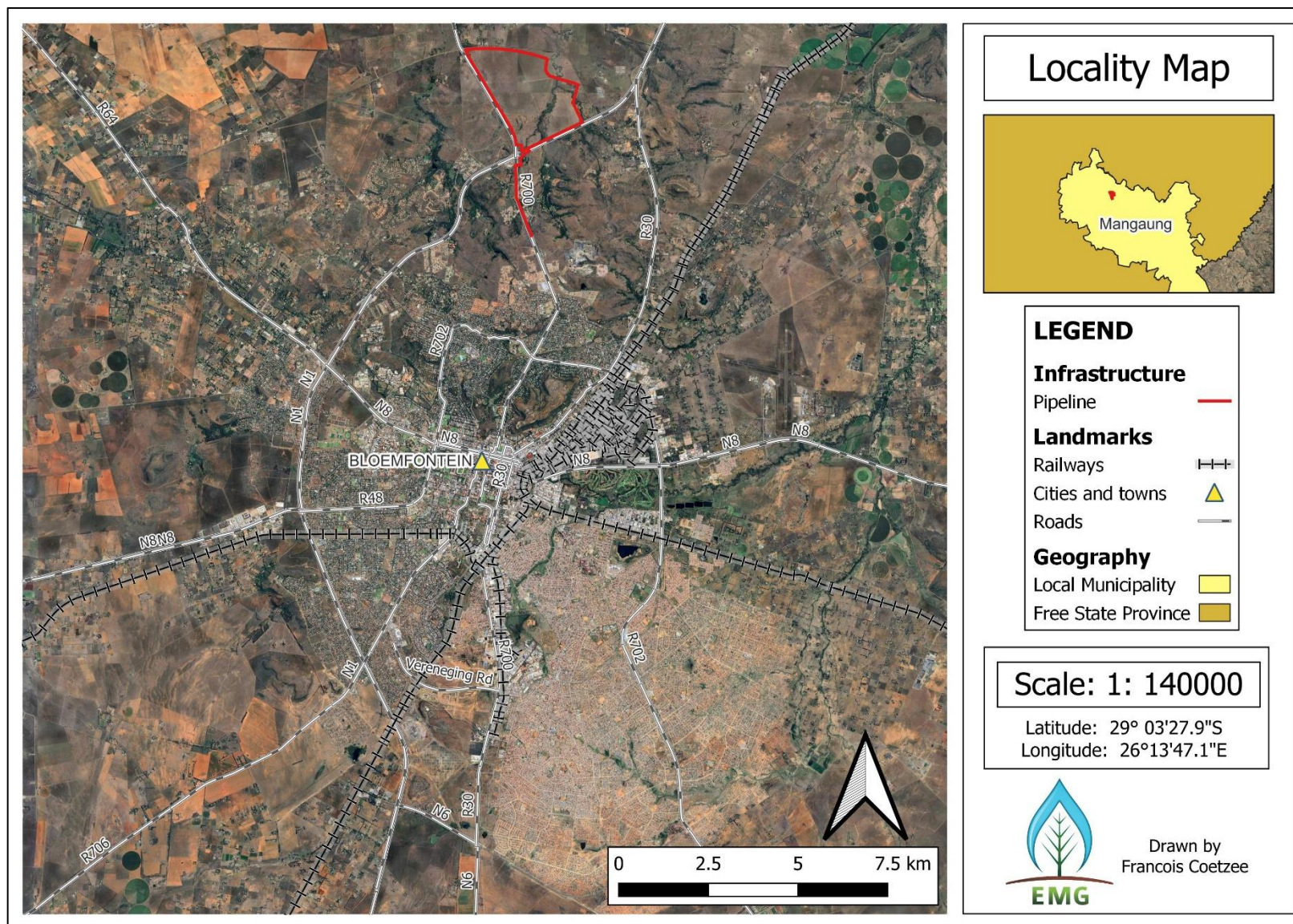


Figure 3 The locality map of the proposed development.

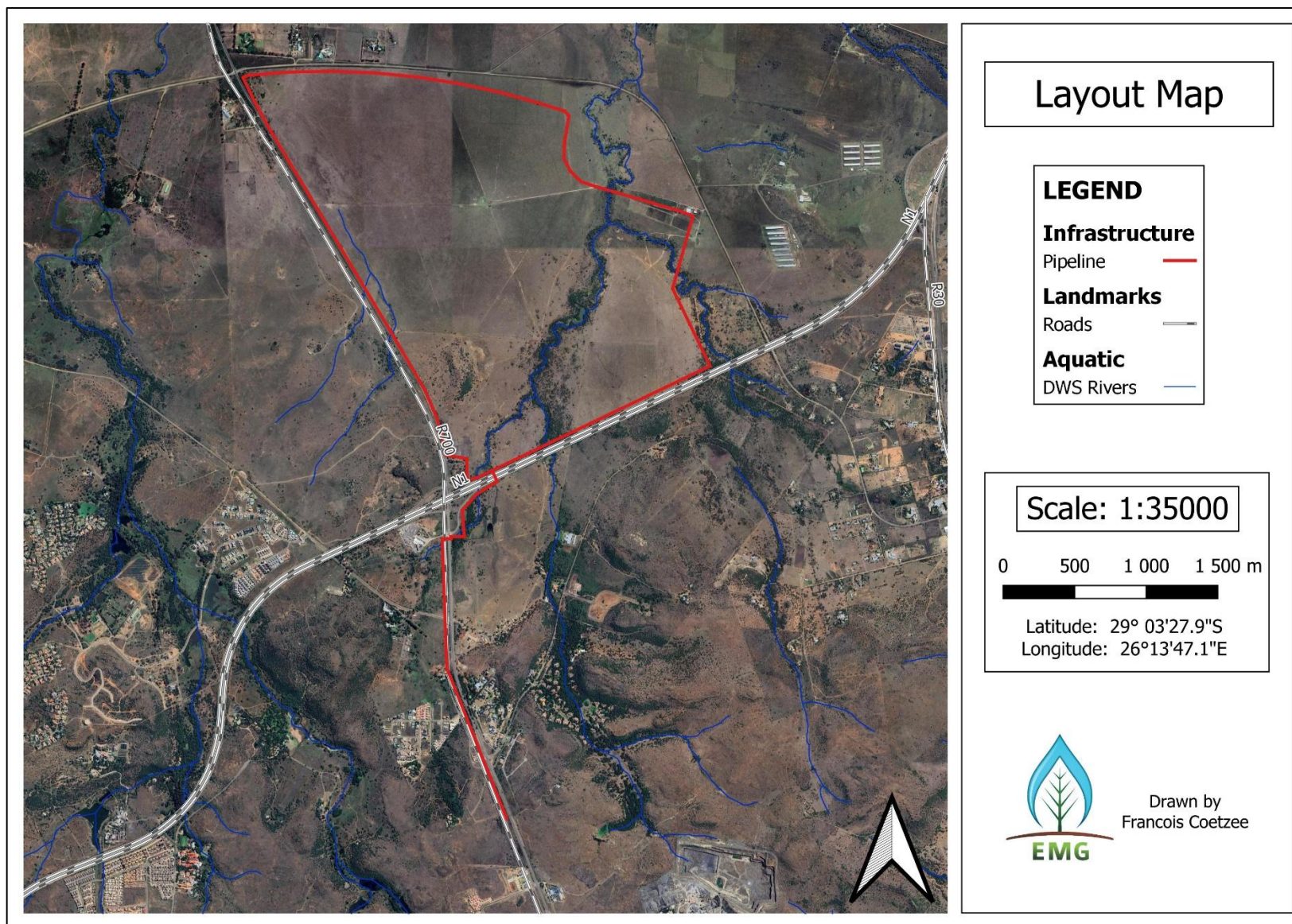


Figure 4 Layout map of the proposed development.

2.2. RECEIVING ENVIRONMENT:

Environment: The project site traverses the Bloemfontein Dry Grassland, Winburg Grassy Shrubland, and Bloemfontein Karroid Shrubland vegetation types, all of which are classified as Least Concern (LC). The alignment intersects several non-perennial watercourses. The proposed pipeline route has been strategically positioned predominantly within already disturbed areas, such as existing servitudes and transformed landscapes, to minimise additional environmental disturbance. The development falls within Ecological Support Areas (ESA 1 and ESA 2). The project is also located in close proximity to the Woodland Hills Golf and Wildlife Estate and the Dwaal Valley Private Nature Reserve.

2.3. SOCIO-ECONOMIC BENEFITS

The planned pipeline is anticipated to contribute positively to the economy of the MMM. The growing demand for housing within the Northern Extension serves as a key driver for development, which is expected to stimulate further economic growth and expansion as the area continues to develop. The proposed project will enhance the supply of potable water to the northern areas of Bloemfontein, thereby improving municipal service delivery, public health, and overall quality of life. Improved water security supports residential growth, local economic development, and the functioning of social infrastructure. During the construction phase, the project is expected to generate temporary employment opportunities, particularly for unskilled and semi-skilled labour from surrounding communities. This includes opportunities for site preparation, trenching, pipe laying, backfilling, and general construction support activities.

2.4. SPECIALIST STUDIES

The following specialists have been consulted for the site as follows:

-  **Aquatic Ecological Assessment** – Mr AJH. Lamprecht (EcoFocus Consulting)
-  **Phase 1 Heritage Impact Assessment** – Dr L Rossouw (Paleo Field Services)
-  **Terrestrial Ecological Impact Assessment** – Mr J Giddy (Environmental Management Group).

3. ROLE PLAYERS AND RESPONSIBILITY MATRIX:

In order for the EMPr to be successfully implemented, all the role players involved in the project need to cooperate. For this to happen, role players must clearly understand their roles and responsibilities in the project, must be professional, form respectful and transparent relationships, and maintain open lines of communication.

Table 3 Functions and Responsibilities of Project Team

Key	Function	Responsibility
P	Proponent	Proponent is ultimately accountable for ensuring compliance to the EMPr. The ECO must be contracted by the Proponent (full time or part time depending on the size of the project) as an independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of the EMPr for the project. The Proponent is further responsible for providing and giving mandate to enable the ECO to perform responsibilities. The developer must ensure that the ECO is integrated as part of the project team.
CE	Consulting Engineer	Contracted by the developer to design and specify the project engineering aspects. Generally, the engineer runs the works contract. The CE may also fulfil the role of Project Manager on the proponent's behalf (See PM).
PM	Project Manager	The Project Manager has over-all responsibility for managing the project, contractors, and consultants and for ensuring that the environmental management requirements are met. The CE may also act as the PM. All decisions regarding environmental procedures must be approved by the PM. The PM has the authority to stop any decommissioning activity in contravention of the EMPr in accordance with an agreed warning procedure.
ER	Engineer's Representative	The consulting engineer's representative on site. Has the power/mandate to issue site instructions and in some instances, variation orders to the contractor, following request by the EO or ECO. The ER oversees site works, liaison with Contractor and ECO.
EO/EM	Environmental Officer / Environmental Manager	Appointed by the Consulting Engineers as their environmental representative on site. The EO is not independent but must rather act on behalf of the consulting engineers with the mandate to enforce compliance under the project contract, which must include the EMPr. The EO has the directive to issue non-conformance and hazard certificates. Further, in terms of accepted industry practice the EO could issue the equivalent of a "cease works" instruction only in exceptional circumstances where serious environmental harm has been or is about to be caused i.e. in cases of extreme urgency and then only when the ER is absent. The EO must form part of the project team and be involved in all aspects of project planning that can influence environmental conditions on the site. On certain types of projects, such as linear

	developments (fences, pipelines, etc), the EO must also be the liaison between the contractor and landowners. The EO must attend relevant project meetings, conduct daily inspections to monitor compliance with the EMPr, and be responsible for providing reports and feedback on potential environmental problems associated with the development to the project team and ECO. The EO must convey the contents of this EMPr to the Contractor site team and discuss the contents in detail with the Contractor as well as undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce. The EO must be suitably experienced with the relevant qualifications and preferably competent in construction-related methods and practices.
ECO Environmental Control Officer	An independent appointment to objectively monitor implementation of relevant environmental legislation, conditions of Environmental Authorisations (EA's), and the EMPr for the project. The ECO must be on site prior to any site establishment and must endeavour to form an integral part of the project team. The ECO must be proactive and have access to specialist expertise as and when required, these include botanists, ecologists, etc. Further, the ECO must also have access to expertise such as game capture, snake catching, etc. The ECO must conduct audits on compliance to relevant environmental legislation, conditions of EA, and the EMPr for the project. The size and sensitivity of the development, based on the EIA, will determine the frequency at which the ECO will be required to conduct audits. (A minimum of a monthly site inspection must be undertaken). The ECO must be the liaison between the relevant authorities and the project team. The ECO must communicate and inform the developer and consulting engineers of any changes to environmental conditions as required by relevant authoritative bodies. The ECO must ensure that the registration and updating of all relevant EMPr documentation is carried out. The ECO must be suitably experienced with the relevant environmental management qualifications and preferably competent in construction related methods and practices. The ECO must handle information received from whistle blowers as confidential and must address and report these incidences to the relevant Authority as soon as possible. On small projects, where no EO is appointed, the ECO must convey the contents of this EMPr to the Contractor site team and discuss the

		contents in detail with the Contractor as well as undertake to conduct an induction and an environmental awareness training session prior to site handover to all contractors and their workforce.
C	Contractor	The principal contractor, hereafter known as the 'Contractor', is responsible for implementation and compliance with the requirements of the EMPr and conditions of the EA's, contract and relevant environmental legislation. The Contractor must ensure that all sub-contractors have a copy of and are fully aware of the content and requirements of this EMPr. The contractor is required, where specified, to provide Method Statements setting out in detail how the management actions contained in the EMPr will be implemented.
ESO	Environmental Site Officer	The ESO is employed by the Contractor as his/her environmental representative to monitor, review and verify compliance with the EMPr by the contractor. This is not an independent appointment; rather the ESO must be a respected member of the contractor's management team. Dependent on the size of the development the ESO must be on site one week prior to the commencement of construction. The ESO must ensure that he/she is involved at all phases of the construction (from site clearance to rehabilitation).
A	Lead Authority	The authorities are the relevant environmental department that has issued the Environmental Authorisation. The authorities are responsible for ensuring that the monitoring of the EMPr and other authorisation documentation is carried out, this will be achieved by reviewing audit reports submitted by the ECO and conducting regular site visits.
OA	Other Authorities	Other authorities are those that may be involved in the approval process of an EMPr. Their involvement may include reviewing EMPrs to ensure the accuracy of the information relevant to their specific mandate. Other authorities may be involved in the development, review or implementation of an EMPr. For example, if a specific development requires a water use licence for the relevant national authority, then that authority should review and comment on the content of the particular section pertaining to that mandate.
EAP	Environmental Assessment Practitioner	The definition of an environmental assessment practitioner in Section 1 of NEMA is " <i>the individual responsible for the planning, management and coordination of environmental impact assessments, strategic environmental assessments, environmental management plans or any other appropriate environmental instruments introduced through regulations</i> ".

4. PROJECT PHASING

In order for this EMPr to be effective, a pro-active route must be taken by addressing potential problems before they occur. This should limit corrective measures required during later phases of the development. In particular, this EMPr deals with the following phases as detailed below: From a practical perspective, the project lifecycle will likely be phased as follows:

4.1. PLANNING AND FINAL DESIGN PHASE

The Environmental Management Plan (EMPr) presents an invaluable opportunity to implement proactive environmental management measures aimed at achieving sustainable development. By adopting these proactive measures, the likelihood of adverse impacts occurring during both the construction and operational phases can be significantly reduced. While there remains a possibility of accidental impacts, the establishment of contingency plans, such as this EMPr, during the planning phase allows for the implementation of corrective actions to further mitigate potential issues. This phase also encompasses the planning of detailed designs.

The project details would be finalised to allow financing and agreements with all affected stakeholders. If the project completes this phase, it will then proceed to the next phase.

4.2. PRE-CONSTRUCTION

The pre-construction phase comprises all activities required to prepare the site for construction and to establish the environmental and social management controls that must guide the works. This period is critical to ensuring that planning processes are finalised, risks are minimised, and that both environmental and social safeguards are embedded before any physical works commence. Effective pre-construction preparation reduces the likelihood of delays, non-compliance, and unnecessary environmental degradation during construction.

Detailed design undertaken by the Engineer must remain fully consistent with the project description and approved layout assessed as part of the environmental authorisation process. Where deviations are required, such changes must be addressed through the appropriate amendment pathway under the NEMA EIA Regulations. The design must also integrate all specialist recommendations and mitigation measures arising from the environmental assessment.

Before the main contractor mobilises to the site, the boundaries of the authorised development footprint must be clearly demarcated. Similarly, all no-go areas, including sensitive ecological features, watercourses, heritage areas, and any buffers recommended by specialists, must be identified, mapped, and fenced off. Once demarcation has been completed to the satisfaction of the Environmental Control Officer (ECO), the contractor may establish the construction camp and commence mobilisation of personnel, equipment, and temporary facilities.

Management of social risk is a key requirement during this period. An appropriate grievance mechanism must be established at the outset to allow community members, affected stakeholders, and workers to raise concerns safely and effectively. All contractor staff must

undergo environmental and social induction training, facilitated by the ECO, to ensure awareness of site sensitivities, compliance obligations, and behavioural

Typical pre-construction activities include:

-  Appointment of the ECO and establishment of environmental governance systems
-  Pre-construction induction training/workshops led by the ECO for all site personnel
-  Finalisation and demarcation of approved working areas and no-go areas
-  Establishment of the construction camp, laydown areas, materials handling zones, and site offices
-  Demarcation and preparation of fuel storage areas, hazardous materials stores, and waste management facilities
-  Identification and rescue of protected or sensitive plant species, *where applicable* and as recommended by specialists, Flora and Fauna Permit.
-  Establishment of erosion and stormwater controls prior to ground-breaking
-  Preparation of site access routes and transport plans
-  Final confirmation of emergency response procedures and communication protocols

4.3. CONSTRUCTION

The construction phase includes all activities required to establish the authorised infrastructure, construct associated services, and manage temporary facilities needed for the works. All activities must be undertaken in compliance with the EMP, method statements, and specialist recommendations, with continual oversight by the ECO.

Typical construction phase activities include the following:

-  Access Roads
 - Where feasible, existing access routes will be utilised to minimise disturbance. Permanent, existing operational gravel roads will be maintained. All access routes must be clearly demarcated, compacted where necessary, and maintained to prevent erosion and dust generation.
-  Site Preparation
 - Vegetation clearing will be undertaken within the approved development footprint and laydown areas, and work zones. Clearing must be limited to the minimum area required for construction. Topsoil removed during site preparation must be stripped, stockpiled separately, protected against erosion, and reserved for rehabilitation of disturbed areas. Sensitive areas, no-go zones, and buffers must remain demarcated and undisturbed throughout the construction phase.
-  Transportation of Equipment and Components
 - Construction equipment, mechanical components, structural materials, and ancillary items will be transported to the site via existing public roads and the existing access routes. The delivery of excavators, graders, compactors, trucks, cranes, and other heavy machinery must follow approved transport management procedures. Measures must be put in place to prevent damage to public roads, manage traffic safety, and minimise dust and noise impacts.
-  Establishment of Workshops, Laydown Areas, and Construction Camps

- Dedicated temporary facilities, including workshops, storage yards, laydown areas, and equipment camps, will be established within the demarcated construction footprint. These areas must include appropriate bunded zones for fuel storage, hazardous materials containment, waste handling areas, and secure storage for construction materials. All fuel storage and refuelling points must incorporate spill-prevention measures, drip trays, fire-fighting equipment, and emergency response procedures to prevent contamination of soil or water resources.



Construction of Infrastructure

- The approved infrastructure, including pipelines, foundations, structural elements, and associated civil works, will be constructed in accordance with the detailed design and method statements. Activities include excavation, trenching, concrete works, mechanical installation, structural assembly, and associated testing and commissioning. Erosion control, stormwater diversion, and sediment traps must be in place throughout.



Site Rehabilitation

- Upon completion of construction activities, all temporary infrastructure, including construction camps, laydown areas, and waste stockpiles, must be dismantled and removed. Disturbed areas must be re-shaped where necessary, covered with stockpiled topsoil, and re-vegetated using locally appropriate species to promote site stabilisation. All waste, excess materials, and contaminated soils must be removed to licensed facilities. Rehabilitation must be undertaken to ensure the site is left in a stable, safe, and environmentally compliant condition.

4.4. OPERATION

By implementing proactive measures during the planning and construction phases, it is possible to mitigate potential environmental impacts that may occur during the operational phase. This strategy not only reduces risks but also decreases the required monitoring efforts. However, it is important to note that monitoring will still remain a necessary component of the overall process.

5. OBJECTIVES OF THE EMP_R:¹

The specific objectives of this EMP_R are to:

-  To provide explicit operational guidelines and environmental monitoring requirements during the construction phases so that activities are done in an environmentally responsible and sustainable manner.
-  To benefit the host communities, minimise the impacts on the environment and to ensure the health and safety of the community by creating a development that eliminates unacceptable health hazards and ensures public and animal safety.
-  To enable the proponent and its contractors to use resources efficiently and effectively during the project lifecycle in order to reduce wastage and thereby reduce associated negative environmental impacts. In addition, the aim is also to handle waste streams responsibly and apply the 'reduce, re-use and recycle' principle, wherever possible
-  To leave areas disturbed by construction in a rehabilitated, stable, non-polluting and tidy condition.

6. IDENTIFICATION OF ENVIRONMENTAL ASPECTS AND IMPACTS:

The contractor shall identify likely aspects before commencing with any construction activity. Examples of environmental aspects include:

-  Vegetation clearance
-  Altering historical structures of significance
-  Noise and vibration generation
-  Ecological disturbance
-  Landscape alteration
-  Waste generation

Thereafter, the contractor shall programme his work in such a way that each cause and effect of a construction activity is also identified, and the activity planned to prevent any impacts from happening. If prevention is not practicable, or in the event of a mishap or misapplication, the contractor shall provide plans and measures for the engineer's approval that will limit and contain the magnitude, duration, and intensity of the impact. The contractor shall demonstrate that he can carry out any repair and reinstatement of the damaged environment. Listed below are some environmental impacts that could adversely alter an aspect of the environment through usual construction and operational activities:

-  Pollution of atmosphere, soil or water
-  Destruction or removal of fauna and flora and effect on biological diversity
-  Deformation of the landscape
-  Soil erosion
-  Water contamination
-  Effect on the built environment

The table below outlines both potential and existing impacts, their nature, and the associated project phases in which they are expected to occur.

¹ The implementation of the EMP_R is not an additional or "add on" requirement. The EMP_R is legally binding through NEMA.

Table 4 Potential anticipated impacts of the development on the environment.

Environmental Aspect	Potential Anticipated Impact	Phase	Status	Significance <i>pre-mitigation</i>	Significance <i>post-mitigation</i>
Ecological impacts					
Habitat loss	Loss of habitat and species diversity as a result of construction and the removal of natural elements.	Planning	N/A	N/A	N/A
		Construction	Negative	Low	Low
		Operation	N/A	N/A	N/A
Loss of ESA	Disturbance and loss of ecological habitat and ecological corridors.	Planning	N/A	N/A	N/A
		Construction	Negative	Low	Low
		Operation	N/A	N/A	N/A
Loss of indigenous floral and faunal diversity	Habitat loss and fragmentation due to vegetation clearance and construction activities	Planning	N/A	N/A	N/A
		Construction	Negative	Low	Low
		Operation	N/A	N/A	N/A
Loss of floral species of special conservation concern	Loss of species diversity as a result of construction and the removal of natural elements.	Planning	N/A	N/A	N/A
		Construction	Negative	Low	Low
		Operation	N/A	N/A	N/A
Heritage impacts					
Archaeological and Heritage Resources	Destruction of archaeological and heritage resources such as remains and graves.	Planning	N/A	N/A	N/A
		Construction	Negative	Low	Low
		Operation	N/A	N/A	N/A
Palaeontological Resources	Destruction of undiscovered artefacts of palaeontological significance.	Planning	N/A	N/A	N/A
		Construction	Negative	Low	Low
		Operation	N/A	N/A	N/A
Watercourse impacts					
Surface and Ground Water Contamination	Water and/or soil pollution causes negative changes in the physical, chemical and biological characteristics of water resources (i.e. water quality). This can result in possible deterioration in aquatic ecosystem integrity and a reduction in, or loss of, species of conservation concern (i.e. rare, threatened/endangered species).	Planning	N/A	N/A	N/A
		Construction	Negative	Low-Medium	Low
		Operation	N/A	N/A	N/A
		Planning	N/A	N/A	N/A

Alteration of Hydrology and Flow Regimes	Alteration or impeding of flow regimes (volumes and peak flows), which directly impacts the ecological functionality and integrity of the local watershed and the broader quaternary surface water catchment and drainage area.	Construction	Negative	Low	Low
		Operation	N/A	N/A	N/A
Erosion & Sedimentation	Sedimentation and erosion refer to the alteration in the physical characteristics of rivers/wetlands because of increased turbidity and sediment deposition, caused by soil erosion and earthworks that are associated with construction activities, as well as instability and collapse of unstable soils during project operation	Planning	N/A	N/A	N/A
		Construction	Negative	Low	Low
		Operation	N/A	N/A	N/A
Aquatic and Riparian Ecosystems	The deterioration of biodiversity through the direct removal of species and the accidental introduction of alien and invasive species which outcompete indigenous fauna.	Planning	N/A	N/A	N/A
		Construction	Negative	Low-Medium	Low
		Operation	N/A	N/A	N/A
Aesthetics					
Construction of Infrastructure	Negative overall aesthetic value due to construction	Planning	N/A	N/A	N/A
		Construction	Negative	Low-Medium	Low
		Operation	N/A	N/A	N/A
Air Quality, Noise and Vibrations:					
Noise and Vibrations	Vehicles, machinery, and equipment used during construction activities increase noise and vibrations.	Planning	N/A	N/A	N/A
		Construction	Negative	Low-Medium	Low
		Operation	N/A	N/A	N/A
Air quality	Mobilisation of equipment, land clearing, earthworks, and general construction activities that generate dust, emissions, and fallout occur along the route.	Planning	N/A	N/A	N/A
		Construction	Negative	Low-Medium	Low
		Operation	N/A	N/A	N/A
Waste Impact					
General Solid and Hazardous Waste	Improper handling, storage, or disposal of general and hazardous waste, together with accidental spills of fuels, oils, lubricants, and other hazardous substances, may result in soil and groundwater contamination, degradation of water quality, and pollution of the surrounding environment.	Planning	N/A	N/A	N/A
		Construction	Negative	Low-Medium	Low
		Operation	N/A	N/A	N/A
Socio-economic impacts					
Job creation and the influx of job seekers	Impacts associated with the need for locally appointed construction/operation workers.	Planning	N/A	N/A	
		Construction	Positive	Medium	
		Operation	Positive	Medium	

7. LEGAL REQUIREMENTS:

7.1. GENERAL:

Construction activities will be done according to the best environmental practices identified in the project approvals and designs. This EMPr, which forms an integral part of the contract documents, informs the contractor of his duties in fulfilling the project objectives, with reference to the prevention and mitigation of environmental impacts caused by construction activities associated with the project.

The contractor should note that obligations imposed by the EMPr are legally binding in terms of environmental statutory legislation and in terms of the additional conditions to the general conditions of contract that pertain to this project. In the event that any rights and obligations contained in this document contradict those specified in the standard or project specifications, then the latter shall prevail.

To further ensure compliance, the Duty of Care principles outlined in Section 28 of NEMA (Act no. 107 of 1998) are integrated into this EMPr. These principles mandate that all individuals and organisations involved in the project take reasonable measures to prevent, minimise, and rectify significant environmental pollution or degradation. This includes historical pollution and future potential impacts. Key responsibilities under the Duty of Care include:

-  Investigating and assessing potential environmental impacts.
-  Informing and educating employees about environmental risks and safe practices
-  Modifying activities to prevent environmental harm
-  Containing pollutants and preventing their spread.
-  Eliminating sources of pollution and degradation
-  Remediating any damage caused to the environment.

7.2. STATUTORY AND OTHER APPLICABLE LEGISLATION:

The contractor and applicant/manager are deemed to have made themselves conversant with all legislation pertaining to the environment, including provincial and local government ordinances, which may be applicable to the contract.

7.3. ADMINISTRATION OF ENVIRONMENTAL OBLIGATIONS

7.3.1 APPOINTMENT OF AN ESO

For the purposes of implementing the conditions contained herein, the contractor shall submit to the engineer for approval the appointment of a nominated representative of the contractor as the ESO for the contract. The request shall be given, in writing, at least fourteen days before the start of any work, clearly setting out reasons for the nomination, and with sufficient detail to enable the engineer to make a decision. The engineer will, within seven days of receiving the request, approve, reject, or call for more information on the nomination. Once a nominated representative of the contractor has been approved, he/she shall be the ESO and shall be the responsible person for ensuring that the provisions of the EMPr are complied with during the life of the contract. The engineer will be responsible for issuing instructions to the contractor where environmental considerations call for action to be taken. The ESO shall submit regular

written reports to the engineer at least once a month. The engineer shall have the authority to instruct the contractor to replace the ESO if, in the engineer's opinion, the appointed officer is not fulfilling his/her duties in terms of the requirements of the EMPr or this specification. Such instruction will be in writing and shall clearly set out the reasons for a replacement.

Before the contractor begins each construction activity, the ESO shall give to the engineer a written statement setting out the following:

-  The type of construction activity.
-  Locality where the activity will take place.
-  Identification of the environmental aspects and impacts that might result from the activity.
-  Methodology for impact prevention for each activity or aspect.
-  Methodology for impact containment for each activity or aspect.
-  Emergency/disaster incident and reaction procedures.
-  Treatment and continued maintenance of the impacted environment.

The contractor may provide such information in advance of any or all construction activities, provided that new submissions shall be given to the engineer whenever there is a change or variation to the original.

The engineer may provide comments on the methodology and procedures proposed by the ESO, but he shall not be responsible for the contractor's chosen measures of impact mitigation and emergency/disaster management systems. However, the contractor shall demonstrate at inception and at least once during the contract that the approved measures and procedures function properly.

7.3.2 COMMUNICATION PROCEDURES ON SITE

Each of the books described below must be available in duplicate, with copies for the Engineers Representative (ER), Environmental Site Officer (ESO) and Environmental Controlling Officer (ECO), or alternatively, an agreement could be reached to use a single system. These books should be available to the authorities for inspection or on request. Contractor's meeting minutes must reflect environmental queries, agreed actions and dates of eventual compliance. These minutes form part of the official environmental record.

7.3.3 SITE INSTRUCTION ENTRIES

The Site Instruction Book entries will be used to record general site instructions related to the works on site. It will also be used to issue stop-work orders to immediately halt any particular contractor activities in light of the environmental risks they may pose.

7.3.4 ESA DIARY ENTRIES

The purpose of these entries will be to record the comments of the ESA as they relate to activities on the site.

7.4. TRAINING

The designated ESO must be conversant with all legislation pertaining to the environment applicable to this contract, must be appropriately trained in environmental management, and must possess the skills necessary to impart environmental management skills to all personnel involved in the contract. The contractor shall ensure that adequate environmental training takes place. All employees shall have been given an induction presentation on environmental awareness. Where possible, the presentation needs to be conducted in the language of the employees. The environmental training should, as a minimum, include the following:

-  The importance of conformance with all environmental policies;
-  The environmental impacts, actual or potential, of their work activities;
-  The environmental benefits of improved personal performance;
-  Their roles and responsibilities in achieving conformance with the environmental policy and procedures and with the requirements of the Agency's environmental management systems, including emergency preparedness and response requirements;
-  The potential consequences of departure from specified operating procedures;
-  The mitigation measures required to be implemented when carrying out their work activities.

In the case of permanent staff, the contractor shall provide evidence that such induction courses have been presented. In the case of new staff (including contract labour) the contractor shall inform the engineer when and how he intends to conclude his environmental training obligations.

7.5. RECORD KEEPING:

All records related to the implementation of this management plan (e.g., site instruction book and method statements) must be kept together in an office where it is safe and can be retrieved easily. These records should be kept for a minimum of two years during the construction phase and inevitably during the operational phase, and should at any time be available for scrutiny by any relevant authorities.

It is recommended that photographs be taken of the site **prior to, during, and immediately after construction** as a visual reference. These photographs should be stored with other records related to this EMP.

7.6. COMPLIANCE AND PENALTIES:

The contractor shall act immediately upon receiving a notice of non-compliance and correct whatever is the cause of the notice. Complaints received regarding activities on the construction site pertaining to the environment shall be recorded in a dedicated register, and the response shall be noted with the date and action taken. Any non-compliance with the agreed procedures of the EMP is a transgression of the various statutes and laws that define how the environment is managed; therefore, any avoidable non-compliance, depending on severity, shall be considered sufficient grounds for contact to be made with relevant provincial or national authorities. The responsible provincial or national authorities shall ensure

compliance and impose penalties relevant to the transgression as allowed for within their statutory powers.

7.7.REPORT AVAILABILITY:

Copies of this EMPr must be kept at the construction site office and will be accessible to all senior contract personnel. All personnel working on the project shall be required to familiarise themselves with the contents of this document.

8. ENVIRONMENTAL MITIGATION SPECIFICATIONS FOR IMPACTS:

8.1. DESIGN PHASE

Impact management outcome: Potential environmental impacts are reduced through appropriate design and planning.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance
	Planning	Construction	Operation			
8.1.1 Assimilate the requirements of the EMPr into the design and construction process, with particular consideration of specialist recommendations and identified impacts.	X			 ECO  ESO	 Once-off	 Environmental audits by the ECO should be conducted and filed on-site.
8.1.2 Ensure all necessary permits and licenses are in place before site establishment commences.	X	X		 ECO  ESO	 Once-off	 Permits and licences register; copies of permits/licences in environmental file; ECO verification note/audit record; site establishment sign-off.
Comments:						

8.2. SITE ESTABLISHMENT

Impact management outcome: It is important to ensure that the setup of the construction area does not result in excessive environmental degradation and that construction activity is carried out in a manner that minimises environmental impact.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance
	Planning	Construction	Operation			
8.2.1 Site establishment area shall be approved by the ECO prior to finalisation.	X	X		 ECO	 Once off / prior to establishment	 ECO approval of site placement
8.2.2 A securely fenced construction camp shall, where practicable, be established on previously disturbed land within the approved site boundaries, located at least 100 m from watercourses and away from sensitive habitats.	X			  Contractor ECO (monitoring and verification)	 Once off / prior to establishment  The fencing of the construction yard should be established before the commencement of construction and be maintained throughout the project.	 ECO approval of site placement
8.2.3 The planning and design for the construction camp must ensure that there is a minimum impact on the environment.	X			  Contractor ECO (monitoring and verification)	 Once off / prior to establishment	 ECO approval of site placement
8.2.4 The contractor is responsible for providing all sanitary arrangements for their and the sub-contractor's team. At least one toilet must be	X	X		  Contractor ECO (monitoring)	 Continuously	 The toilet service agreement and a regularly updated register of sanitary waste

	provided for every 15 persons. Where facilities are available, the contractor may use them when it is viable and possible.				and verification)		disposal should be kept in the environmental file.
8.2.5	The Contractor shall inform all site staff of the use of supplied ablution facilities, and under no circumstances shall indiscriminate excretion and urinating be allowed other than in supplied facilities. If mobile chemical toilets become required, the following must be ensured: • Toilets are located no closer than 100 m to any watercourse or water body. • Toilets have an external closing mechanism and are closed and secured from the outside when not in use to prevent toilet paper from being blown out. • Toilets are secured to the ground to prevent them from toppling due to wind or any other cause. • Toilets are placed on the flat ground. • No spillage occurs when the toilets are cleaned or emptied, and the contents are managed in accordance with the EMP. • Toilets are emptied before long weekends and workers' holidays, and must be locked after working hours.	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Continuously, the on-site EO/ESO's site visit should take place bi-weekly.  Any environmental incidents should be recorded as soon as they are encountered.	 ECO approval of site placement  The toilet service agreement and a regularly updated register of sanitary waste disposal should be kept in the environmental file.  The environmental incidents register should be kept in the environmental file.
8.2.6	Suitable waste collection bins shall be provided where required. All solid waste shall be collected and disposed of at a registered waste disposal facility. Copies of waste disposal certificates shall be obtained and retained in the environmental file.		X		 Contractor  ECO (monitoring and verification)	 Continuously, the on-site EO/ESO's site visit should take place bi-weekly.	 Environmental file containing all relevant documentation  Waste disposal register should be kept.
8.2.7	The surface area of the working corridor must be kept as small as possible and should be contained to the 10 m construction area. All watercourses outside the working corridor are to be considered No-Go areas. Any unnecessary intrusion into these areas is prohibited. Where	X	X		 Contractor  ECO (monitoring and verification)	 Throughout the project.  The on-site EO/ESO's site visit should take place bi-weekly.	 Environmental monthly audits by the ECO.  Photographic records.

	intrusion is required, the working corridor must be kept to a minimum and clearly identified and demarcated before any construction commences, to minimise impact.						
8.2.8	The edges of the construction/rehabilitation areas should be clearly demarcated using highly visible material (e.g., fencing poles 5 m apart) prior to construction commencing.		X		 Contractor ECO (monitoring and verification)	 Throughout the project.  The on-site EO/ESO's site visit should take place bi-weekly.	 Environmental monthly audits by the ECO.  Photographic records.
8.2.9	All construction activities should be restricted to the authorised areas, and no disturbance shall occur outside of these areas.	X	X		 Contractor ECO (monitoring and verification)	 Throughout the project.  The on-site EO/ESO's site visit should take place bi-weekly.	 Environmental monthly audits by the ECO.  Photographic records.
8.2.10	Access to and from the development area should be either via existing roads or within the construction servitude.	X	X		 Contractor ECO (monitoring and verification)	 Throughout the project.  The on-site EO/ESO's site visit should take place bi-weekly.	 Environmental monthly audits by the ECO.  Photographic records.
8.2.11	Adequate signage must be provided in construction areas and be appropriately secured to prevent livestock movement and casual access as far as possible.	X	X		 Contractor ECO (monitoring and verification)	 Throughout the project.  The on-site EO/ESO's site visit should take place bi-weekly.	 Environmental monthly audits by the ECO.  Photographic records.
8.2.12	All formal documentation should be kept at the site office and be made available during monthly audits. This includes: - All environmental induction/ awareness training documents. - Environmental complaints register/ I&AP register. - Environmental emergency procedures.		X		 Contractor EO/ESO ECO (monitoring and verification)	 Throughout the project.  The on-site EO/ESO's site visit should take place bi-weekly.  Environmental audits by the	 Environmental monthly audits by the ECO.  Photographic records.

- Records of all environmental incidents. - A formal agreement with a toilet service provider. - Waste management plan and disposal register. - Stormwater action plan. - The environmental management plan (EMPr). - Approved Environmental Authorisation - Method Statements.					independent ECO should take place monthly.	
Comments:						

8.3. SOCIAL ENVIRONMENTAL ISSUES:

Impact management outcome: It is essential to minimise any negative perception by taking proactive measures to prevent any social conflicts or social gaps and to develop a positive attitude in the community in close proximity to and potentially involved with the project, as well as minimising environmental harm or degradation that might be prevented by training. The following management strategies are to be implemented:						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance
	Planning	Construction	Operation			
8.3.1 Ensure that all site personnel have a basic level of environmental awareness training.	X	X		 Contractor  EO/ESO  ECO	 Any new staff shall receive the same relevant training before they commence their duties.	 A register of trained personnel and training content must be kept in the environmental file.

8.3.2 Environmental training must include, at a minimum, the following: • The conditions and controls linked to the EA and within the EMPr were made aware of their individual roles and responsibilities in achieving compliance with the EA and EMPr. • Description of significant environmental impacts, actual or potential, related to their work activities. • Mitigation measures to be implemented when carrying out specific activities. E.g., cleanup procedures in the event of chemical spills. • Emergency preparedness and response procedures. • Procedures to be followed when working near or within sensitive areas. • No-go areas. • Water usage and conservation. • Solid waste management procedures. • Fire prevention. • Identifying dangerous snakes and reptiles. • Procedures when encountering dangerous animals. • Mitigation measures for the most common spills. • The need for a “clean site” policy • Energy conservation practises- such as minimizing diesel consumption by turning off construction vehicles when not in use. • Stockpile maintenance.	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Any new staff shall receive the same relevant training before they commence their duties.  Re-induction should take place after a construction break.  In the case of inactivity of greater than 1 month, re-induction training shall be provided.	 A register of trained personnel and training content must be kept in the environmental file.
8.3.3 In order to optimise the opportunities for local businesses to supply goods and services to the project, the contractor will do a survey of the capabilities of the goods and services that are locally available that are of an acceptable standard and quality, and a survey of the capabilities of local construction companies, and identify opportunities for local suppliers.	X			 Contractor  ECO (monitoring and verification)	 Prior to procurement and as required during construction. Verify that local supplier and contractor	 Local supplier and contractor survey/report, procurement records, list of identified local suppliers and service providers, and records of local

					opportunities have been assessed.	procurement where applicable.
8.3.4 Transparent fair recruitment and procurement practices should be implemented. The contractor chosen should maximise local community involvement in construction and support activities, to the extent possible, based on available skills. Whenever possible, training programmes should be developed that address both construction-stage skills requirements and long-term employment demand.	X			 Contractor ECO (monitoring and verification)	 Fair recruitment practices and prioritisation should be made to competent individuals within the local community.	 Recruitment and procurement records demonstrating fair and transparent practices.  Records of local employment and procurement.  Training records, attendance registers, and training material (where applicable).  Employment records indicating local community participation.
8.3.5 Staff operating equipment (such as excavators, loaders, etc.) shall be adequately trained and sensitised to any potential hazards associated with their tasks.	X	X		 Contractor ECO (monitoring and verification)	 Any new staff shall receive the same relevant training before they commence with duties.	 Training records, attendance registers, and training material (where applicable).
8.3.6 Adequate notification should be provided to people residing close to where construction activities are taking place, especially if they are to be affected by them.	X	X		 Contractor ECO (monitoring and verification)	 Prior to commencing construction activities in affected areas and as required when construction progresses to new areas.	 Copies of community notices, notification letters, public notices, attendance registers (where applicable), and a record of stakeholder notifications.

8.3.7	Public complaints register and system to ensure that community complaints are clearly investigated and adequate remedial action taken should be instituted.	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 A public complaints register must be compiled, printed out, and kept in the environmental file on site in case of any public complaints.	 The public complaints register should be kept in the environmental file.
8.3.8	Good housekeeping practices should be implemented in both the construction yard and at the construction site.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the project.  The on-site EO/ESO's site visit should take place bi-weekly.	 Environmental monthly audits by the ECO.  Photographic records.
8.3.9	If Blasting is to occur, proper notification and record of blasting should occur. All adjacent landowners should be notified 2 weeks in advance.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to any blasting activities and for each blasting event.	 Copies of notifications issued to adjacent landowners, blasting records/logs, proof of notification at least two weeks in advance, and blasting permits (where applicable).
Comments:							

8.4. HANDLING OF EMERGENCIES

Impact management outcome: Emergency incidents, while inherently risky, can result in greater secondary impacts. The following mitigation measures must be implemented to prevent these impacts.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance
	Planning	Construction	Operation			
8.4.1 All situations that can lead to emergency situations should be identified, and response strategies should be provided. The situations should include fire, first aid, and a major chemical spill.	X			 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to the commencement of construction, and reviewed as required throughout the construction phase.	 The environmental incidents register should be kept in the environmental file.  Environmental audits by the ECO.  Photographic record.
8.4.2 Emergency and contact numbers of the contractors must be available and prominently displayed on a signage board that is clearly visible.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 The contact details of all relevant departments should be obtained before the commencement of construction.	 Clearly visible and in the environmental file containing all relevant documentation
8.4.3 An Emergency Response Action Plan (ERAP). This must address accidents, potential spillages, and fires in line with relevant legislation.	X			 Contractor  EO/ESO  ECO (monitoring)	 Prior to the commencement of construction and maintained	 All files must be kept in the environmental file.  Environmental audits by the ECO.

				and verification)	throughout the construction phase. Review and update as required.	 Photographic record.
8.4.4 All staff must be made aware of emergency procedures as part of environmental awareness training.	X			   Contractor EO/ESO ECO (monitoring and verification)	 Any new staff shall receive the same relevant training before they commence their duties.	 A signed register of attendance must be kept for proof.
8.4.5 All emergencies/ incidents should be reported and distributed to the relevant parties.		X		   Contractor EO/ESO ECO (monitoring and verification)	 As required, following every emergency or incident.	 Incident reports, records of notification to the relevant local authority, correspondence or communication logs, and records of actions taken.
8.4.6 In the event of an emergency, necessary mitigation measures to contain the spill or leak must be implemented.		X		   Contractor EO/ESO ECO (monitoring and verification)	 As required, immediately following any spill or leak incident.	 Spill/incident reports  Records of mitigation and clean-up actions  Photographic evidence (where applicable)  Records of disposal of contaminated materials.
8.4.7 Equipment for dealing with emergencies, such as spill kits, firefighting equipment, first aid boxes, etc., shall be made available and personnel properly trained in their use.	X	X	X	  Contractor ECO (monitoring and verification)	 Prior to the commencement of construction and throughout the construction phase. Inspect equipment regularly and ensure personnel are trained.	 Inspection records of emergency equipment  Training records, attendance registers  Photographic evidence confirming the availability of spill kits, firefighting equipment, and first aid kits.

8.4.8	Any spills that enter a watercourse or have the potential to cause harm must be reported to the Department of Water and Sanitation immediately.		X		 Contractor  ECO (monitoring and verification)	 As required, immediately following any spill that enters or has the potential to enter a watercourse.	 Incident reports  Records of notification to the Department of Water and Sanitation  Correspondence or communication logs  Records of corrective actions implemented.
Comments:							

8.5. CLEARING AND GRUBBING

Impact management outcome: It is important to minimise unnecessary environmental degradation and destruction resulting from vegetation clearance to make space for construction.							
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance	
	Planning	Construction	Operation				
8.5.1 The machinery for certain tasks should be carefully considered to minimise the extent of environmental damage.	X	X		 Contractor  ECO (monitoring and verification)	 Prior to the commencement of construction activities and throughout the construction phase, as required.	 Plant and equipment selection records  Site inspection records  Photographic evidence confirming the use of appropriate machinery.	

8.5.2	Habitat disturbance and vegetation clearance should be restricted to the authorised area, retaining as much natural vegetation as possible to stabilise soil and limit erosion.	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Inspect daily to ensure that the limits of clearing and grubbing are not exceeded.  The boundaries of the development area should be demarcated.  Environmental audits by the ECO should take place monthly.	 The environmental incidents register should be kept in the environmental file.  Environmental audits by the ECO should be kept in the environmental file.  Photos taken of the development area before, during, and after development.
8.5.3	When excavating in wetlands and watercourses, it is important to remove the upper 30 cm of topsoil along with the vegetation and store it as sods on-site. These sods should subsequently be placed back on top of the installed pipelines. Subsoil is to be utilized for backfilling, rather than as a top dressing. Only the removed sods and topsoil should be used to rehabilitate the bed and bank surfaces.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 During excavation, pipeline installation, and backfilling  Rehabilitation within wetlands and watercourses.	 Site inspection records, photographic evidence of topsoil/sod removal, storage and replacement  ECO monitoring reports  Rehabilitation records confirming correct backfilling and reinstatement of the bed and banks.
8.5.4	Cleared indigenous vegetation should be mulched for use in rehabilitation.		X		 Contractor  ECO (monitoring and verification)	 During vegetation clearing and rehabilitation activities.	 Site inspection records  Photographic evidence of mulching and reuse of cleared indigenous vegetation, and ECO monitoring reports.
8.5.5	The rate of vegetation clearance shall not exceed the rate of construction.		X		 Contractor  ECO (monitoring and verification)	 Throughout vegetation clearing and construction activities.	 Site inspection records  Construction progress records  Photographic evidence

					 Monitor regularly to ensure clearing does not exceed the active construction front.	 ECO monitoring reports confirming that vegetation clearing is limited to the active work area.
8.5.6 All barren/unvegetated spaces cleared during construction, which also includes the creation of topsoil stockpiles, should be kept clear of vegetation.		X		  Contractor ECO (monitoring and verification)	 Throughout the construction phase. Monitor cleared areas and topsoil stockpiles regularly to prevent vegetation establishment.	   Site inspection records Photographic evidence ECO reports
8.5.7 Open fires are not permitted in the construction footprint.		X		  Contractor ECO (monitoring and verification)	 Throughout the construction phase. Monitor the construction footprint during routine site inspections.	  Site inspection records ECO monitoring reports,
8.5.8 No new roads or tracks may be created except where such routes are specifically approved and within the existing servitude.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction phase. Monitor access routes during routine site inspections.	   Site inspection records Photographic evidence ECO monitoring reports,
8.5.9 No personnel or construction materials will be allowed to move outside the designated / demarcated site during construction activities.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction phase. Monitor access routes during routine site inspections.	   Site inspection records Photographic evidence ECO monitoring reports,

8.5.10 Vegetation clearance must be restricted to the narrow linear route of the proposed 10 m construction footprint, as far as practicably possible/feasible.	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to and during vegetation clearing activities.  Daily monitoring during clearing activities.	 Site inspection reports.  ECO audit reports.  Photographic records of cleared areas.  Approved site layout plans indicating the 10 m construction footprint.
Comments:						

8.6. STOCKPILE AND SOIL MANAGEMENT

Impact management outcome: Topsoil is conserved, maintained, and reused. it is imperative that careful attention is given to the handling of soils from trenching, to stockpiling and backfilling. This would ensure minimal soil loss through erosion, reduced deterioration of soil quality and would subsequently assist in rehabilitative measures.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.6.1 Stabilisation measures of stockpiles shall be implemented to prevent erosion. This can include the use of erosion blankets or mulch.		X		 Contractor  ECO (monitoring and verification)	 Throughout the construction phase.	 Site inspection records  Photographic evidence  ECO reports

8.6.2	Immediately after any section of trench is backfilled or any earthworks are completed, the area must be stabilised.		X		 Contractor EO/ESO ECO (monitoring and verification)	 Following completion of backfilling or earthworks in each work section  Daily during active construction  Verified during routine ECO site inspections.	 Site inspection reports  ECO audit reports  Photographic records (before and after stabilisation)  Completed rehabilitation checklists  Contractor site records confirming stabilisation measures implemented.
8.6.3	Replace topsoil after backfilling to allow re-vegetation and prevent prolonged exposure of subsoil.		X		 Contractor EO/ESO ECO (monitoring and verification)	 Within two weeks of backfilling for each completed section  Monitored during daily construction activities	 Site inspection reports  ECO audit reports  Photographic records (before and after stabilisation)  Completed rehabilitation checklists  Contractor site records confirming stabilisation measures implemented.
8.6.4	Topsoil (upper 200 – 300 mm) must be stripped, stockpiled (< 2 metres) and re-spread		X		 Contractor EO/ESO ECO (monitoring and verification)	 Within 3 months, to maintain seed-bank integrity.  Stockpiles inspected regularly during construction	 Site inspection reports  ECO audit reports  Photographic records of topsoil stripping, stockpiling  Contractor site records confirming compliance with stockpile height and re-spreading timeframe.
8.6.5	Topsoil shall be cleared of woody and invasive vegetation before stripping and removed under dry conditions, where practicable, to minimise compaction.		X		 Contractor EO/ESO ECO (monitoring	 Prior to and during topsoil stripping activities.	 Site inspection records  Photographic evidence of vegetation clearing and topsoil stripping

				and verification)	 Monitor during vegetation clearing and topsoil removal.	 ECO monitoring reports confirming compliance with topsoil management requirements.
8.6.6 Topsoil should not accidentally be mixed with waste contaminated with oil, diesel, petrol, garbage, or any other material, which may inhibit the later growth of vegetation.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Continuously during topsoil stripping, stockpiling, handling and re-spreading activities  Monitored daily during construction	 Site inspection records  Photographic evidence of vegetation clearing and topsoil stripping  ECO monitoring reports confirming compliance with topsoil management requirements.  Spill incident reports
8.6.7 Soil stockpiles shall not be higher than 2m or stored for a period longer than 6 months.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Stockpiles to be inspected weekly during construction and after significant rainfall events  Compliance with stockpile height and storage duration verified during routine ECO site inspections.	 Site inspection records  Photographic evidence of vegetation clearing and topsoil stripping  ECO monitoring reports confirming compliance with topsoil management requirements.
8.6.8 Dust and erosion of topsoil from runoff must be minimised through appropriate watering and the avoidance of transporting and placing topsoil in areas exposed to high wind or excessively rainy conditions		X		   Contractor EO/ESO ECO (monitoring and verification)	 Daily during topsoil handling activities  During high wind, rainfall events, and other adverse	 Site inspection records  Photographic evidence of vegetation clearing and topsoil stripping  ECO monitoring reports confirming compliance with

					weather conditions	topsoil management requirements.
8.6.9 Topsoil stockpiles should be protected, located in flat areas where run-off will be minimised and sediment recoverable, stored out of drainage pathways and all no-go areas.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Daily during topsoil handling activities 	 Site inspection records  Photographic evidence of vegetation clearing and topsoil stripping  ECO monitoring reports
8.6.10 A photographic record must be kept of the topsoil stockpiles		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Photographs to be taken upon establishment of each stockpile  Periodically throughout storage, and prior to re-spreading	 Dated and geo-referenced photographic records should be kept in the environmental file
8.6.11 The contractor shall apply soil conservation measures to the stockpiles to prevent erosion. This could include the use of erosion control fabric or grass seeding.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Upon establishment of stockpiles and throughout the storage period  Inspected weekly and after significant rainfall events;	 Site inspection records  Photographic evidence of vegetation clearing and topsoil stripping  ECO monitoring reports
8.6.12 Alien vegetation growing on stockpiles must be eradicated. Herbicides shall not be used to remove alien vegetation unless approved by the ECO.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Stockpiles to be inspected weekly and prior to topsoil re-spreading  Alien vegetation removed as	 Site inspection reports  ECO audit reports  Photographic records before and after alien vegetation removal  Alien invasive species control records

					 soon identified as Any herbicide application requires prior ECO approval and verification during routine site inspections.	 ECO approval records for herbicide use
Comments:						

8.7. EROSION & SEDIMENT MANAGEMENT

Impact management outcome: Construction activities will require the removal of vegetation cover, potentially resulting in soil erosion and subsequent impacts on surface water quality due to uncontrolled rainwater run-off. The following measures are necessary to minimise the effects						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.7.1 Where possible, soil movement activities should be conducted during the drier months of the year to minimise the possibility of erosion, sedimentation and transport of suspended solids associated with disturbed areas and rainfall	X	X		 Contractor  ECO (monitoring)	 During construction planning and scheduling, prior to	 ECO audit reports  Method statements and planning documents demonstrating

events. Planning for such a situation must be undertaken.				and verification)	commencement of soil movement activities, and throughout construction.  Activities and weather conditions to be monitored daily	consideration of seasonal conditions  Contractor site records.  Environmental audits by the ECO.  Photographic records.
8.7.2 Regular inspection of the footprint and access routes is required to identify erosion, sediment build-up, or preferential flow pathways; corrective actions should be implemented immediately to maintain surface stability.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Weekly during construction.  After significant rainfall events.  Corrective actions to be implemented immediately where erosion, sediment build-up, or preferential flow pathways are identified.	 Site inspection reports.  ECO audit reports.  Photographic records.
8.7.3 Sedimentation must be avoided and minimised with appropriate measures.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout construction activities.  Weekly during construction.  After significant rainfall events.	 Site inspection reports.  ECO audit reports.  Photographic records.
8.7.4 Adequate measures must be implemented to manage storm water runoff and clean/dirty water separation to prevent significant surface water contamination and soil erosion.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to the commencement of construction activities.  Throughout the construction period.	 Site inspection reports.  ECO audit reports.  Photographic records.

					 Weekly during construction.	
8.7.5 Materials excavated from the proposed development at the proposed watercourse- and wetland sections must be adequately placed/stockpiled outside the watercourse- and wetland extents on the upstream side of the trench, before being backfilled into the trench after pipeline placement. This must be done to prevent significant contamination of watercourses and wetlands by surface material or soil.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Prior to and during excavation at all watercourse and wetland crossings.  Continuously while excavated material is stockpiled.  During backfilling activities.	 Site inspection reports.  ECO audit reports.  Photographic records of stockpile locations and trench backfilling.  Method statements for watercourse and wetland crossings.
8.7.6 Implement adequate stormwater and erosion management measures during the construction- and subsequent operational phases of the proposed development. This must be done to sufficiently manage stormwater runoff and clean/dirty water separation, in order to prevent any significant surface water contamination of the local and broader surrounding landscape as well as prevent any significant soil erosion from occurring within and around the proposed development footprint and to attempt to maintain the ecological connectivity, - functionality and - integrity of the local watershed and broader sub-quaternary surface water catchment and drainage area	X	X		   Contractor EO/ESO ECO (monitoring and verification)	 Prior to commencement of construction activities.  Throughout construction and operational phases.  Weekly inspections during construction.  After significant rainfall events.  Routine monitoring of stormwater controls, erosion measures and clean/dirty water separation systems.	 Stormwater management plan/designs.  Erosion and sediment control plans.  Site inspection reports.  ECO audit reports.  Photographic records

					 Corrective actions to be implemented immediately where issues are identified.	
Comments:						

8.8. SURFACE & GROUND WATER QUALITY

Impact management outcome: Poor chemical storage, poor waste management practices, and poor material management processes may lead to the contamination of water sources. Sewage, sanitary effluent, and contaminated wastewater runoff can adversely affect the quality of receiving water bodies unless properly managed. To eliminate the risk of contamination, the following measures have to be instituted.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.8.1 Responsible water use shall be promoted among all personnel.	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  During inductions site and toolbox talks.	 Induction and toolbox talk attendance registers.  ECO audit reports.

					 Routine monitoring during daily site activities.	
8.8.2 Washing of equipment shall be done in a container to prevent any runoff of contaminated washing water.	X	X		   Contractor EO/ESO ECO (monitoring and verification)	   Throughout the construction period whenever equipment washing is undertaken.  Daily monitoring during active construction.	   Site inspection reports. ECO audit reports. Photographic records of designated equipment washing areas and containers.
8.8.3 Grey water should be recycled: - Used for dust suppression - Used (reused) to clean equipment.		X		   Contractor EO/ESO ECO (monitoring and verification)	  Throughout the construction period where grey water is generated.  Daily monitoring of water reuse practices during active construction activities.	   Site inspection reports. ECO audit reports. Water management records.
8.8.4 The wash water (grey water) collected from the cleaning of equipment on-site should not be left standing for long periods of time as this promotes parasite and bacterial proliferation.		X		   Contractor EO/ESO ECO (monitoring and verification)	  Throughout the construction period where grey water is generated.  Daily monitoring of water reuse practices during active construction activities.	   Site inspection reports. ECO audit reports. Water management records.

8.8.5	The final volume of water after cleaning cement mixing equipment for the last time, should be left for a day (no more) to allow the solids to settle out. Once the solids have settled out the water can be decanted and used as grey water. The remaining cementitious sludge should be left to dry out before being disposed of with other solid waste.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period where grey water is generated.  Daily monitoring of water reuse practices during active construction activities.	 Site inspection reports.  ECO audit reports.  Water management records.
8.8.6	Strictly no washing of equipment in watercourses is allowed.		X	X	 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring during equipment operation and maintenance activities.	 Site inspection reports.  ECO audit reports.  Photographic records of equipment washing areas.  Contractor environmental awareness records.  Incident reports if non-compliance occurs.
8.8.7	All used oils, grease or hydraulic fluids should be placed in appropriate impervious containers which should be stored no closer than 100 m from a watercourse.	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period where hazardous substances and maintenance activities occur.  Daily monitoring of storage areas during active construction.  Weekly inspections of storage facilities.	 Site inspection reports.  ECO audit reports.  Photographic records of storage areas and containers.  Hazardous substance/waste management records.

8.8.8	Any construction material with leachable material must be covered and secured with an impermeable tarp in the event of rainfall.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to forecasted rainfall events and throughout the construction period.  Daily monitoring of material storage areas.  After rainfall events to confirm covers remain secure and effective.	 Site inspection reports.  ECO audit reports.  Photographic records of storage areas and containers.  Contractor site records confirming implementation of rain protection measures.
8.8.9	Appropriate drainage facilities must be constructed to ensure water runs smoothly downstream without causing erosion.	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to and during construction activities requiring drainage management.  Regular inspections during construction.  After significant rainfall events to assess functionality and identify erosion.	 Site inspection reports.  ECO audit reports.  Photographic records of drainage facilities  Stormwater management plan
8.8.10	Maintain natural drainage patterns and avoid concentrated discharge points.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  During planning and execution of earthworks and	 Site inspection reports.  ECO audit reports.  Photographic records of drainage facilities  Stormwater management plan

					 drainage-related activities.  Inspected weekly and after significant rainfall events.	
8.8.11 Construction must have contingency plans for high rainfall events during construction. Even in the operational phase, measures to contain impacts caused during high rainfall events must be planned for and available for use.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to commencement of construction activities.  Throughout the construction and operational phases.  Contingency measures reviewed periodically and before periods of anticipated high rainfall.	 Stormwater and high rainfall contingency plans.  Emergency response procedures.  Site inspection reports.  ECO audit reports.
8.8.12 Adequate leakage detection and prevention systems/measures must be implemented for the proposed pipeline in order to detect any potential leakages		X	X	 Contractor  Operations/Maintenance Team	 Prior to commissioning of the pipeline.  During pipeline installation and commissioning.  Routine inspections and maintenance throughout the operational phase.  Immediate investigation and corrective action	 Leak detection system records.  Inspection and maintenance records.  Site inspection reports.  ECO audit reports.

					 if any leakage is detected. The pipeline must be inspected on a regular basis and adequately maintained over time, in order to ensure its continued functionality and prevent any leakages or failures	
Comments:						

8.9. ALTERING & IMPEDING WATERCOURSES

Impact management outcome: Alteration/Impeding of the flow regimes (volumes and peak flow), which directly impacts the ecological functionality and integrity of the local watershed and broader quaternary surface water catchment and drainage area						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.9.1 Trench excavation, pipeline placement and subsequent trench backfilling at the proposed watercourse crossings must be conducted concurrently, in order to ensure continued flow through the area during the construction period.		X		 Contractor  ECO (monitoring and verification)	 Prior to and during construction activities at watercourse crossings.  Continuous monitoring during excavation, pipeline installation and backfilling activities.  Daily inspections during active crossing works.	 Site inspection reports.  ECO audit reports.  Photographic records of watercourse crossing activities.
8.9.2 Under no circumstances may the flow of the watercourses be significantly impeded/blocked for any period of time, during construction		X		 Contractor  EO/ESO  ECO (monitoring)	 Continuously during construction activities within or	 Site inspection reports.  ECO audit reports.  Photographic records of watercourse crossings.

				and verification)	 near watercourses.  Daily monitoring during watercourse crossing activities.  Inspections after rainfall events to ensure flow is maintained.  Immediate corrective action required if flow obstruction or significant impacts are identified.	 Construction method statements.  Contractor site records confirming maintenance of water flow.  Incident and corrective action reports
8.9.3 All the applicable requirements in terms of Sections 9 and 10 of GNR 40229: General Authorisation in terms of Section 39 of the National Water Act, 1998 (Act No. 36 of 1998) for Water Uses as Defined in Section 21(c) or Section 21(i), must be adequately implemented for both the construction- and subsequent operational phases of the proposed development		X	X	 Contractor EO/ESO  ECO (monitoring and verification)	 Prior to commencement of construction activities.  Throughout construction and operational phases.  Regular inspections to verify compliance with General Authorisation conditions.	 Approved Water Use Authorisation/General Authorisation documentation (where applicable).  Compliance monitoring reports.  ECO audit reports.
8.9.4 Materials excavated from the proposed pipeline trench at the proposed watercourse crossings must be adequately placed/stockpiled outside the watercourse extents on the upstream side of the	X	X		 Contractor ECO (monitoring and verification)	 Prior to and during excavation at all watercourse crossings.	 Site inspection reports.  ECO audit reports.  Photographic records

trench, before being backfilled into the trench after pipeline placement.					 Continuous monitoring during stockpiling and trenching activities.  During backfilling and reinstatement works.	
8.9.5 Trench excavation, pipeline placement and subsequent trench backfilling at the proposed watercourse crossings must be conducted manually underneath the riparian woodland- and woody thicket canopies and no trees may be removed, as far as practicably possible/feasible.		X		 Contractor EO/ESO  ECO (monitoring and verification)	 Prior to and during construction activities within riparian woodland and woody thicket areas.  Continuous monitoring during excavation, pipeline installation and backfilling activities.  Daily inspections during active works in sensitive areas.	 Site inspection reports.  ECO audit reports.  Photographic records of construction activities within riparian areas.
8.9.6 It is recommended that the construction of the proposed watercourse crossings be conducted during the winter season as far as practicably possible/feasible. The flow of the watercourses will be significantly reduced during this time, which should ease the excavation activities and result in reduced impeding of- and impact on flow		X		 Contractor ECO (monitoring and verification)	 During construction planning and scheduling of watercourse crossing activities.  Prior to commencement	 Construction programme/work schedule indicating planned timing of watercourse crossings.  Site inspection reports.  ECO audit reports.  Photographic records

					 of works within watercourses.  Throughout construction to verify timing and minimise impacts on watercourse flow.	
8.9.7 Any lower flow during the winter season must however still be adequately diverted/channelled around the construction area of the proposed watercourse crossings, in order to ensure continued flow		X		 Contractor  ECO (monitoring and verification)	 Prior to commencement of watercourse crossing activities.  Continuously during construction within watercourses.  Immediate corrective action required if water flow is obstructed.	 Site inspection reports.  ECO audit reports.  Photographic records
8.9.8 If winter construction is however not practicably possible/feasible, the construction of the proposed watercourse crossings must be completed within a maximum 10-day period of which the weather forecast predicts no possibility of rainfall		X		 Contractor  ECO (monitoring and verification)	 Prior to commencement of watercourse crossing activities.  Weather forecasts must be reviewed and considered during construction planning.  Continuous monitoring	 Construction programme  Weather forecast records.  Site inspection reports.  ECO audit reports.

					throughout the crossing construction period to ensure completion within the approved timeframe.  Daily monitoring of weather conditions and site conditions during active works.  Immediate corrective action if rainfall occurs or conditions increase environmental risk.	
Comments:						

8.10. FUANA & FLORA MANAGEMENT

Impact management outcome: Fauna and flora are negatively impacted by the clearance of vegetation, noise from construction activities (disturbance) and gathering/ hunting of flora and fauna by workers. Physical removal and transformation of habitat, as well as the resultant establishment of Exotic and legally declared alien invasive species and spreading throughout the local and broader surrounding aquatic landscape The following measures are necessary to mitigate impacts.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.10.1 Vegetation removal shall be limited to areas where it is essential for the continuation of the project.		X		 Contractor  ECO (monitoring and verification)	 Prior to and during vegetation clearing activities.  Daily monitoring during active clearing activities.  Verified during routine ECO site inspections to ensure clearing is restricted to approved areas only.  Any unnecessary vegetation removal must be addressed immediately.	 Site inspection reports.  ECO audit reports.  Photographic records of cleared areas.  Approved site layout plans indicating clearing limits.

8.10.2 The area should be monitored for newly established alien species during the contract and establishment period, which, if present, must be removed. Removal of these species shall be undertaken in a way that prevents any damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas	X	X		 Contractor ECO (monitoring and verification)	 Regular inspections of disturbed areas and rehabilitation zones.  Alien vegetation to be removed as soon as identified.  Follow-up inspections to confirm prevention of re-infestation.	 Site inspection reports.  ECO audit reports.  Photographic records before and after alien species removal.  Alien invasive species monitoring and removal records.  Rehabilitation monitoring records.
8.10.3 A thorough walk-through of the study area by a qualified zoologist/ avifaunal specialist should occur to locate any potential SCC/protected species.				 Contractor ECO (monitoring and verification)	 Prior to commencement of vegetation clearance and construction activities.  Additional inspections where new areas are opened for construction or where required by the specialist.	 Zoological/Avifaunal walk-through survey report.  Specialist recommendations.  Site inspection reports.  ECO audit reports.  Photographic records
8.10.4 All staff should be trained on SCC/protected species, observations of SCC/protected species, and the reporting procedure.		X		 Contractor EO/ESO ECO (monitoring and verification)	 Prior to commencement of construction activities.  During site inductions and toolbox talks.  Refresher training where required or when	 Environmental induction records.  Toolbox talk attendance registers.  Training material/presentations.  SCC/protected species awareness records.

					 new personnel are appointed.  Ongoing monitoring during construction to ensure reporting procedures are followed.	 Incident and observation reports.  ECO audit reports.  Site inspection reports.
8.10.5 Should any SCC be located during construction activities, construction should be halted, and a qualified specialist should be contacted.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 As required, whenever a Species of Conservation Concern (SCC) is encountered during construction.	 Incident records  ECO reports  Records of work stoppages  Photographic evidence.
8.10.6 Educate all staff undertaking the work on the best practice methods and environmentally sensitive areas (general dos and don'ts).				 Contractor  EO/ESO  ECO (monitoring and verification)	 Any new staff shall receive the same relevant training before they commence with duties.  Re-induction should take place after a construction break.  In the incidence in which there is a period of inactivity of greater than 1 month, re-induction training shall be provided.	 Environmental induction records.  Toolbox talk attendance registers.  Training material/presentations.  Environmental awareness records.  Site inspection reports.  ECO audit reports.
8.10.7 If any protected plant species are located, they should be demarcated.		X		 Contractor  EO/ESO	 Prior to commencement of vegetation	 Site inspection reports.  ECO audit reports.  Photographic records

				 ECO (monitoring and verification)	clearing and construction activities.  Continuous monitoring during construction activities in areas with potential protected species.  Protected plant species to be demarcated immediately upon identification.	
8.10.8 Removal or relocation of the SCC is prohibited without the appropriate permits.		X		 Contractor EO/ESO  ECO (monitoring and verification)	 Throughout construction activities.  Verification prior to any removal or relocation of SCC.	 Applicable permits/authorisations for SCC removal or relocation  ECO audit reports.  Photographic records.  SCC monitoring records.
8.10.9 Removal or transplant permits from DESTEA must be obtained for all provincially protected fauna/flora.		X		 Contractor EO/ESO  ECO (monitoring and verification)	 Prior to commencement of any removal or transplant activities involving provincially protected fauna/flora.  Verification before construction commences in affected areas.	 DESTEA removal/transplant permits.  Site inspection reports.  ECO audit reports.  Protected species records.  Photographic records.

8.10.10 No illegal harvesting or collecting of plant material is allowed.		X	   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Daily supervision of site personnel.  Routine ECO site inspections.  Immediate investigation and corrective action if illegal harvesting is identified.	 Site inspection reports.  ECO audit reports.  Environmental induction and toolbox talk records.  Incident and non-conformance reports.  Corrective action records.  Photographic records.
8.10.11 An alien invasive species management plan must be drafted if the need for such management emerges.		X	   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction and rehabilitation periods.	 Alien Invasive Species Management Plan.  Site inspection reports.  ECO audit reports.  Alien invasive species monitoring records.  Photographic records.
8.10.12 Vehicle movement shall be restricted to the authorised construction footprint and designated access routes. Off-road driving is strictly prohibited.		X	   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of vehicle movements.	 Site inspection reports.  ECO audit reports.  Photographic records.
8.10.13 Wildlife elements such as nests and burrows should be carefully inspected, and animals should be responsibly removed by a relevant specialist.		X	   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Removal or relocation to be undertaken only by a qualified specialist before works continue.	 Site inspection reports.  ECO audit reports.  Faunal specialist reports.  Photographic records.

8.10.14 A comprehensive fire management plan needs to be drafted prior to construction.	X			 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to commencement of construction activities.	 Approved Fire Management Plan.  All files should be filed in the on-site environmental file.
8.10.15 It is recommended that a temporary wire fence be installed around excavations to prevent faunal access of the area. Should any fauna become trapped in excavations, a qualified individual must be responsible for their safe relocation and release.		X		 Contractor  ECO (monitoring and verification)	 Prior to and throughout excavation activities.  Daily inspections of open excavations to ensure fencing is intact and to check for trapped fauna.  Immediate rescue and relocation of any trapped fauna by a suitably qualified individual.	 Site inspection reports.  ECO audit reports.  Photographic records of temporary fencing and excavations.  Daily excavation inspection checklists.  Faunal rescue and relocation records
8.10.16 No hunting, trapping, or killing of fauna is allowed.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Daily supervision of site personnel.  Routine ECO site inspections.	 Site inspection reports.  ECO audit reports.  Environmental induction and toolbox talk records.
8.10.17 Open fires are not permitted.		X		 Contractor  EO/ESO  ECO (monitoring)	 Throughout the construction period.  Daily supervision of site personnel.	 Site inspection reports.  ECO audit reports.  Environmental induction and toolbox talk records.

				and verification)	 Routine ECO site inspections.	
8.10.18 Limit the removal of vegetation in these ESA areas. Activities within the ESA area must be strictly limited to what is absolutely required for the development. For example, mixing of cement, if possible, ready-made cement should be used to prevent excess cement residue.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Prior to and during construction activities within ESAs.  Daily monitoring of vegetation clearing and construction activities.  Routine ECO site inspections to verify that activities are confined to the approved footprint and that appropriate construction methods are implemented.	   Site inspection reports. ECO audit reports. Photographic records of ESA areas before, during and after construction.
8.10.19 Equipment used should be washed down before coming on site, and before leaving to avoid transporting seeds (invasive species) or plant diseases to or from the site.		X		  Contractor ECO (monitoring and verification)	 Throughout the construction period.	   Site inspection reports. ECO audit reports. Equipment wash-down records/checklists.  Photographic records
8.10.20 It is recommended that no bright light from any spotlights or perimeter lights or loud/excessive noise should be emitted into the surrounding landscape during the nighttime. As little light emissions as practicably/reasonably possible from the construction phase should occur during nighttime, as this could lure aquatic bird- and		X		  Contractor ECO (monitoring and verification)	 Throughout the construction period, particularly during any nighttime activities. • Daily monitoring	   Site inspection reports. ECO audit reports. Photographic records

other nocturnal avifaunal species individuals towards the perimeter fences and potentially result in collisions and mortality					of lighting and noise levels during night work.	
8.10.21 Holding areas for plants must be demarcated and utilised.		X		 Contractor ECO (monitoring and verification)	 Throughout vegetation clearing, plant rescue and transplantation activities.	 Site inspection reports.  ECO audit reports.  Photographic records of demarcated holding areas and rescued plants.  Plant rescue/translocation records
Comments:						

8.11. WASTE MANAGEMENT

Impact management outcome: It is important to manage waste production and handling to prevent environmental contamination strategically.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.11.1 The contractors must provide and maintain a method statement for "solid waste management". The		X		 Contractor	 Prior to commencement	 Approved Solid Waste Management Method Statement.

method statement must provide information on the proposed licensed facility to be utilised, and details must be kept for record-keeping for auditing purposes.				 ECO (monitoring and verification)	 of construction activities.  Method Statement to be maintained and updated as required throughout the construction period.	 Waste disposal/recycling facility licence details.  Waste disposal manifests and weighbridge tickets. • Waste transfer notes. • Site inspection reports. • ECO audit reports. • Waste management records and audit documentation.
8.11.2 Waste must be separated into recyclable and non-recyclable waste. Hazardous waste (e.g. old oil, sealants etc.,) must be separated from general waste (construction rubble).		X		 Contractor EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of waste segregation practices.  Weekly inspections of waste storage areas.	 Site inspection reports.  ECO audit reports.  Photographic records  Waste disposal manifests and hazardous waste disposal certificates.
8.11.3 General waste is to be disposed of at a licensed landfill.		X		 Contractor ECO (monitoring and verification)	 Throughout the construction period.  Each time general waste is removed from site.  Waste disposal records to be maintained continuously.	 Waste disposal manifests.  Licensed landfill disposal receipts  ECO audit reports.  Waste management records.

8.11.4 Any illegal dumping of waste will not be tolerated.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of waste handling and disposal activities.	 Site inspection reports. • ECO audit reports. • Photographic records. • Waste disposal records and manifests.
8.11.5 Waste receptacles should be provided on site, for the disposal of general waste produced by the construction workers.		X		 Contractor  ECO (monitoring and verification)	 Prior to commencement of construction activities.  Throughout the construction period.  Daily monitoring to ensure waste receptacles are available, serviceable and not overflowing.	 Site inspection reports.  ECO audit reports.  Photographic records of waste receptacles.  Waste management records.
8.11.6 Reduce, reuse and recycle strategy needs to be implemented.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to commencement of construction activities.  Throughout the construction period.  Daily implementation of waste minimisation practices.	 Waste Management Plan/Method Statement.  Site inspection reports.  ECO audit reports.  Photographic records.
8.11.7 Designate specific areas for waste storage away from watercourses and drainage systems to prevent contamination.		X		 Contractor  EO/ESO	 Prior to establishment of construction areas.	 Site layout plans indicating designated waste storage areas.

				 ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of waste storage areas.	 Site inspection reports.  ECO audit reports.  Photographic records
8.11.8 Keep records of all waste disposed of, reused, or recycled and ensure proper documentation for regulatory reporting.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Records maintained each time waste is disposed of, reused or recycled.	 Waste registers.  Recycling records and certificates.  ECO audit reports.
8.11.9 Waste may not be burned or buried.				 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of waste handling and disposal practices.	 Site inspection reports.  ECO audit reports.  Photographic records.  Waste management records.
8.11.10 Receptacle bins must be clearly marked for ease of management in terms of the type of waste disposed of, e.g., paper, plastic, glass, etc.		X		 EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.	 Site inspection reports.  ECO audit reports.  Photographic records.  Waste management records.
8.11.11 All refuse bins must have a lid secured so that animals or unauthorised individuals cannot gain access.		X		 EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.	 Site inspection reports.  ECO audit reports.  Photographic records.

						 Waste management records.
8.11.12 Subcontractor(s) contracts must contain a clause to the effect that the disposal of all construction-generated refuse / waste to an officially approved dumping site is the responsibility of the subcontractor in question and that the subcontractors are bound to the management activities stipulated in this EMPr.		X		  EO/ESO ECO (monitoring and verification)	 Throughout the construction period.	    Site inspection reports. ECO audit reports. Photographic records. Waste management records.
8.11.13 All solid and chemical waste that is generated must be removed and disposed of at a licensed waste disposal site on at least a monthly basis.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of waste handling and disposal practices.	    Site inspection reports. ECO audit reports. Photographic records. Waste management records.
8.11.14 Chemical containers and packaging brought onto the site must be removed for disposal at a suitable site.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of waste handling and disposal practices.	    Site inspection reports. ECO audit reports. Photographic records. Waste management records.
8.11.15 If building materials, hydrocarbons or other chemicals are to be stored on site during the construction phase, the storage areas must be situated as far away as practicably possible/feasible from any watercourses (minimum 40 m distance)		X		   Contractor EO/ESO ECO (monitoring and verification)	 Prior to establishment of storage areas.  Throughout the construction period.  Regular inspections of storage areas to ensure compliance with required	    Site layout plans showing designated storage areas. Site inspection reports. ECO audit reports. Photographic records

					distances from watercourses.	
8.11.16 Building material, hydrocarbon and other chemical storage areas must be adequately bunded in order to be able to contain a minimum of 150 % of the capacity of storage tanks/units		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.	 Site layout plans showing designated storage areas.  Site inspection reports.  ECO audit reports.  Photographic records
Comments:						

8.12. AIR QUALITY, NOISE & VIBRATION MANAGEMENT

Impact management outcome: The main sources of impact on air quality, noise and vibration are mobilisation of equipment, land clearing and earthworks during the construction phase. To ensure air quality characteristics of the project area are maintained near the baseline conditions, the following measures shall be implemented:						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.12.1 Only well-maintained vehicles and equipment should be operated on-site, and all machinery should be serviced regularly during the construction stage.		X	X	 Contractor  ECO (monitoring and verification)	 Throughout the construction period.  Daily pre-start inspections of	 Vehicle and equipment inspection checklists.  Preventative maintenance and servicing records.

					vehicles and equipment. Routine servicing in accordance with manufacturer recommendations.	Site inspection reports. ECO audit reports.
8.12.2 Unnecessary simultaneous noisy activities should be avoided.		X		Contractor ECO (monitoring and verification)	Throughout the construction period. Daily monitoring of construction activities and equipment operation.	Site inspection reports. ECO audit reports. Construction programme/work schedules. Environmental induction and toolbox talk records.
8.12.3 No amplified music should be allowed at the site.		X		Contractor EO/ESO ECO (monitoring and verification)	Throughout the construction period. Daily supervision of site activities.	Site inspection reports. ECO audit reports. Environmental induction and toolbox talk records.
8.12.4 Regular inspection and scheduled maintenance of all equipment must be held to ensure that construction vehicles (and operating equipment such as the scrapers) are in good condition, are utilising fuel efficiently and do not smoke.	X	X		Contractor ECO (monitoring and verification)	Prior mobilisation of equipment. Throughout the construction period. Daily monitoring of equipment operation and work practices.	Equipment selection and maintenance records. Site inspection reports. ECO audit reports. Environmental induction and toolbox talk records.
8.12.5 The contractor must keep noise levels within acceptable limits. The use of sound amplification equipment should be restricted for communication and emergencies only.		X	X	Contractor	Throughout the construction period.	Site inspection reports. Incident and complaint records ECO audit reports.

					 Noise monitoring to be undertaken where required or in response to complaints.  Immediate corrective action if excessive noise is identified.	
8.12.6 Any complaints received by the Contractor regarding noise must be recorded and communicated. Where possible, provide daily transport to and from the site for construction workers.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Record and communicate all noise-related complaints immediately upon receipt.	 Noise complaints register.  Complaint investigation and corrective action records.  Site inspection reports.  ECO audit reports.
8.12.7 A Code of Conduct must be developed for the construction phase in terms of behaviour of construction staff.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to commencement of construction activities.  Code of Conduct to be communicated during site induction.	 Approved Code of Conduct.  Signed employee acknowledgements.  Environmental induction and toolbox talk records.  Site inspection reports.  ECO audit reports.
8.12.8 Bare surfaces and excavations must be periodically watered during construction to keep the level down if it becomes apparent that excessive dust is being generated by construction activities.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of dust-generating activities and weather conditions.	 Site inspection reports.  ECO audit reports.  Dust suppression records/logs.  Photographic records.

					 Site inspection with focus on the environmental conditions should be conducted regularly by the EO/ESO, which should be timed with construction activities to ensure that the EO/ESO remains aware of the general conditions during construction.	
8.12.9 Enforce a strict speed limit of 20 km/h for all vehicles along the construction route to reduce dust and vehicle emissions.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of vehicle movements and compliance with speed limits.	   Site inspection reports. ECO audit reports. Photographic records of speed limit signage.
8.12.10 Optimise the construction schedule to minimise the number of vehicles mobilised at any given time, further reducing airborne pollutants.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of vehicle movements.	   Site inspection reports. ECO audit reports. Photographic records of speed limit signage.
8.12.11 Ensure that all construction personnel are trained in dust mitigation practices and the importance of maintaining air quality.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Prior to commencement of construction activities.  During site inductions and toolbox talks.	   Environmental induction records. Toolbox talk attendance registers. Dust mitigation training records.

					 Refresher training provided where required or when new personnel are appointed.  Ongoing monitoring during construction to ensure dust mitigation measures are correctly implemented.	 Training material/presentations.  Site inspection reports.  ECO audit reports.
8.12.12 Where required, provide dust masks for specific construction activities.		X		 Contractor EO/ESO  ECO (monitoring and verification)	 Prior to commencement of dust-generating activities.  Throughout the construction period.  Daily monitoring to ensure appropriate personal protective equipment (PPE) is available and used where required.	 PPE issue registers.  Site inspection reports.  ECO audit reports.  Photographic records
8.12.13 All forms of dust pollution must be managed in terms of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965).		X		 Contractor EO/ESO  ECO (monitoring and verification)	 Prior to commencement of construction activities.	 Site inspection reports.  ECO audit reports.  Dust suppression records.

					 Throughout the construction period.  Daily monitoring of dust-generating activities and implementation of dust suppression measures.	
8.12.14 Construction activities should be limited to between the hours of 7:00 and 17:00.	X	X	X	 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of construction working hours.	 Site inspection reports.  ECO audit reports.  Daily site diary/work records.
Comments:						

8.13. CONTAMINATION OF THE ENVIRONMENT

Impact management outcome: The primary source of impact on the contamination of land is associated with the potential of spills of chemicals and leachable construction materials as well as the improper disposal of general waste. To ensure that the land is not contaminated during such activities the following procedures should be implemented.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.13.1 Material Safety Data Sheets should be kept for all hazardous materials on site.	X	X		 Contractor  EO/ESO  Health and Safety Officer  ECO (monitoring and verification)	 Prior to hazardous materials being brought onto site.  Throughout the construction period.  Regular inspections to ensure current MSDS/SDS are available and accessible for all hazardous materials.	 Material Safety Data Sheets (MSDS/SDS).  Hazardous materials register.  Site inspection reports.  ECO audit reports.
8.13.2 All hazardous substances and stocks such as diesel, oils, detergents, etc., shall be stored in areas with impervious flooring such as concrete and properly bunded out.		X		 Contractor  EO/ESO  Health and Safety Officer	 Prior to hazardous substances being brought onto site.	 Site inspection reports.  ECO audit reports.  Health and Safety inspection records.

				 ECO (monitoring and verification)	 Throughout the construction period.  Daily inspections of hazardous substance storage areas.	 Hazardous substances register.  Photographic records
8.13.3 No refuelling, cement mixing, or hazardous substance storage may take place within 40 m of the delineated watercourses.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to establishment of refuelling, cement mixing and hazardous substance storage areas.  Throughout the construction period.  Daily inspections to verify compliance with the 40 m buffer requirement.	 Approved site layout plans showing the 40 m buffer around watercourses.  Site inspection reports.  ECO audit reports.  Photographic records
8.13.4 All construction machinery and vehicles must be inspected daily for fuel, oil, or hydraulic leaks.	X	X		 Contractor  EO/ESO	 Daily, prior to the commencement of construction activities.  Throughout the construction period.  Routine ECO site inspections to verify inspection records and equipment condition.	 Daily vehicle and equipment inspection checklists.  Maintenance and repair records.  Site inspection reports.  ECO audit reports.

8.13.5 Drip trays must be placed under machinery when parked overnight or during refuelling to catch any drips.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Daily inspections of parked machinery and refuelling areas.	 Site inspection reports.  ECO audit reports.  Photographic records
8.13.6 Concrete should be mixed on impermeable sheeting with runoff contained and may not take place on bare ground.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to commencement of concrete works.  Throughout all concrete mixing activities.  Daily inspections of designated concrete mixing areas.  Immediate corrective action if spills or non-compliance are identified.	 Site inspection reports.  ECO audit reports.  Photographic records
8.13.7 The visible remains either of concrete, solid, or from washings, must be physically removed immediately or disposed of as waste at a registered landfill site.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period, particularly during and after concrete works.  Daily inspections of work areas to identify concrete residues, solid waste or washings.	 Site inspection reports.  ECO audit reports.  Photographic records  Waste disposal register

					 Immediate removal and appropriate disposal when identified.	
8.13.8 Cement batching areas must be located in an area where residues are contained, and the location must not fall within 100 m of any watercourses (including drainage lines).		X		   Contractor EO/ESO ECO (monitoring and verification)	 Prior to establishment of cement batching areas.  Throughout all cement mixing activities during the construction period.	 Site inspection reports.  ECO audit reports.  Photographic records
8.13.9 Spill kits must be readily available on site at all times. All site personnel must be trained in their use. In the event of any spill, immediate action is required: stop the source, contain the spread, and notify the ECO.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Prior to commencement of construction activities.  Throughout the construction period.  Daily inspections to ensure spill kits are available, accessible and adequately stocked.  Spill response training conducted during induction and toolbox talks.  Immediate response required for any spill incident, including	 Photographic records of spill kits.  Environmental induction and toolbox talk records.  Spill response training records.  Spill incident reports.  ECO notification records.  Corrective action reports.

					containment, reporting and corrective action.	
8.13.10 Soil contaminated by fuel/oil/cement must be promptly excavated and removed to an approved hazardous waste facility. Absorbent materials used in cleanup must be disposed of similarly.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Immediately following identification of contamination.  Throughout the construction period.  Daily monitoring of work areas for evidence of spills or contamination.	 Spill incident reports.  Contaminated soil removal records.  Hazardous waste disposal manifests.  Approved hazardous waste facility receipts/certificates.  Photographic records before and after remediation.  ECO audit reports.  Corrective action reports.
8.13.11 Volatile waste items such as plastic bags, cement bags, etc., should be temporarily stored in a suitable manner to prevent them from being dispersed via wind.		X		 EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Daily inspections of waste storage areas to ensure lightweight waste is adequately contained.	 Site inspection reports.  ECO audit reports.  Photographic records of waste storage areas.  Waste management records.
8.13.12 All waste management strategies should comply with environmental / waste management legislation.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Regular review of waste management practices to ensure compliance with	 Approved Waste Management Plan  Waste registers.  Recycling records.  Licensed disposal facility documentation.  ECO audit reports.

					applicable legislation.	
8.13.13 No burning of waste material on site.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of waste management activities.  Immediate corrective action if waste burning is identified.	 Site inspection reports.  ECO audit reports.  Photographic records.  Environmental induction and toolbox talk records.  Waste management records.  Incident and non-conformance reports
8.13.14 No littering may take place on site.		X		   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of waste management activities.  Immediate corrective action if littering is identified.	 Site inspection reports.  ECO audit reports.  Photographic records.  Environmental induction and toolbox talk records.  Waste management records.  Incident and non-conformance reports
Comments:						

8.14. ARCHAEOLOGICAL & HERITAGE MANAGEMENT

Impact management outcome: It is not anticipated that the proposed construction activities will impact any heritage, archaeological, or palaeontological resources, provided that they do not extend beyond the approved development area.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.14.1 The specialist must submit a Chance Find Report to SAHRA or the relevant PHRA documenting the nature, significance and disposition of the material. Construction within the affected area may only resume once written authorisation has been received from the heritage authority or the appointed specialist	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to commencement of construction activities.  Throughout the construction period.  All personnel to be informed of the Chance Find Protocol during environmental induction.  Continuous monitoring during excavation and earthworks  Immediate implementation of the protocol if any	 Environmental induction and toolbox talk records.  Site inspection reports.  ECO audit reports.  Chance find incident reports  Specialist assessment reports

					archaeological, heritage or palaeontological material is discovered.	
8.14.2 Developers must follow a strict protocol if anomalous or irregular shapes are identified in the rock or sediments		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout excavation and earthworks activities.  All personnel must be informed of the required protocol during environmental induction.  Continuous monitoring during trenching and excavation activities.	 Environmental induction and toolbox talk records.  Site inspection reports.  ECO audit reports.  Photographic records  Specialist assessment reports
8.14.3 Demarcate a no-go buffer zone of at least 15 m around the find to prevent further disturbance by personnel, vehicles or machinery. No material may be removed, washed, cleaned or otherwise handled.		X		 EO/ESO  ECO (monitoring and verification)	 Throughout excavation and construction activities.  Immediate compliance required upon identification of any potential find.  All personnel to be informed of this requirement during environmental induction.	 Environmental induction and toolbox talk records.  Site inspection reports.  ECO audit reports.  Photographic records of the find (without disturbance).  Specialist assessment reports  GPS coordinates
8.14.4 The find must be protected by a rigid object (like a box or bucket) and a no-go buffer zone		X		 Contractor  EO/ESO	 Immediately following	 Site inspection reports.  ECO audit reports.

implemented until a professional palaeontologist can confirm the discovery				 ECO (monitoring and verification)	 identification of a potential palaeontological find.  Throughout the construction period during excavation activities.  Continuous protection of the find until assessment and confirmation by a qualified specialist.	 Photographic records of the protected find and buffer area.  Specialist assessment report
8.14.5 SAHRA and a qualified archaeologist to be consulted immediately in the event of accidental archaeological exposure.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Immediately following any accidental archaeological exposure.  Throughout the construction period, particularly during excavation and earthworks.  Continuous monitoring of excavation activities for potential archaeological material.  No further disturbance of	 Incident notification records.  Communication records with SAHRA and archaeologist.  Archaeological assessment report.  Site inspection reports.  ECO audit reports.  Photographic records of the discovery area.

					the exposed material until assessment and guidance have been provided by the relevant specialists.	
8.14.6 Should the material prove to be of archaeological or palaeontological significance, a Phase 2 rescue excavation or systematic collection may be required subject to permits issued by the South African Heritage Resources Agency (SAHRA) or the relevant Provincial Heritage Resources Authority (PHRA). In such cases, the developer must, upon permit approval, appoint a suitably qualified professional archaeologist or palaeontologist to excavate, remove and curate the material in accordance with the conditions of the permit.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Immediately following identification of potential palaeontological material.  Throughout construction activities involving excavation and earthworks.  No further disturbance of the material until assessed by a qualified palaeontologist.  Implementation of approved mitigation/rescue measures where required.	 Specialist palaeontological assessment report.  SAHRA correspondence and issued permits  Phase 2 mitigation/rescue excavation report.  Site inspection reports.  ECO audit reports.  Photographic records.
8.14.7 If potential fossil material, stone artefacts, historical-period objects (e.g., glass, ceramics, metal), human skeletal remains or unmarked grave features are encountered during construction, all activity within the immediate vicinity of the find must cease immediately		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Immediately upon identification of a potential archaeological exposure.	 Environmental induction and toolbox talk records.  Site inspection reports.  ECO audit reports.  Incident notification records.

					 Throughout excavation and earthworks activities.  No further excavation or disturbance until the discovery has been assessed and clearance provided by the relevant specialist /authority.	 Archaeological assessment reports.  Photographic records
8.14.8 No loose chance finds, such as stone age artefacts (arrowheads, stone flake blades, etc.), may be collected.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period, particularly during excavation and earthworks.  Personnel to be informed of the prohibition on collecting chance finds during environmental induction.	 Environmental induction and toolbox talk records.  Site inspection reports.  ECO audit reports.  Photographic records of identified finds  Specialist assessment reports
8.14.9 Regular site inspections and toolbox talks should be conducted to raise awareness among construction personnel about the potential for heritage finds and the importance of reporting them.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to commencement of construction activities.  Throughout the construction period.  Toolbox talks conducted	 Toolbox talk attendance registers.  Environmental induction records.  Heritage awareness training material.  Site inspection reports.  ECO audit reports.

					regularly to reinforce heritage awareness and reporting requirements.  Routine site inspections to monitor compliance and identify potential heritage risks.	
8.14.10 All construction debris/waste should be removed from the site and may not be deposited in on-site excavated waste pits		X		   Contractor EO/ESO ECO (monitoring and verification)	 Throughout the construction period.  Daily monitoring of work areas to ensure construction debris and waste are removed appropriately.	 Site inspection reports.  ECO audit reports.  Waste disposal register.  Licensed landfill disposal receipts/weighbridge tickets.  Photographic records.
Comments:						

8.15. REHABILITATION AND SITE CLOSURE

Impact management outcome: In order to mitigate the inevitable direct and indirect impacts associated with the construction of the proposed development it is necessary to ensure that a practice of constant minimisation of negative impacts and active rehabilitation of completed or affected areas or resources is implemented and monitored.						
Management activity / Control measure	Phase of development			Responsible party	Monitoring frequency / requirement	Evidence of Compliance Planning
	Planning	Construction	Operation			
8.15.1 Rehabilitation should take place wherever possible throughout the construction phase, to prevent sedimentation and protect against erosion.		X	X	 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period.  Rehabilitation activities to commence as soon as areas are no longer required for construction purposes.  Regular monitoring of rehabilitated areas to assess progress and identify areas requiring corrective action.	 Rehabilitation plan/method statement.  Site inspection reports.  ECO audit reports.  Photographic records before, during and after rehabilitation.  Rehabilitation monitoring records.  Revegetation records

8.15.2 On completion of operations, all buildings, structures, or objects on the camp/office site shall be demolished and removed.		X	   Contractor EO/ESO ECO (monitoring and verification)	 At the end of construction/operations and prior to site closure.  Inspection following removal activities to confirm all temporary structures and associated materials have been removed.	 Site closure/demobilisation records.  Site inspection reports.  ECO close-out audit reports.  Photographic records before and after removal.  Waste disposal records/manifests.  Rehabilitation completion records.  Final environmental compliance report
8.15.3 Topsoil previously stored shall be spread evenly to its original depth over the whole area.		X	   Contractor EO/ESO ECO (monitoring and verification)	 During rehabilitation activities and prior to site closure.  Topsoil replacement must be undertaken once construction activities are completed in an area.	 Rehabilitation plan/method statement.  Site inspection reports.  ECO close-out audit reports.  Photographic records before, during and after topsoil replacement.  Topsoil stockpile and spreading records.
8.15.4 Where soils have been compacted owing to traffic (including foot traffic), the surfaces shall be scarified or ripped to aerate and promote infiltration of water.		X	   Contractor EO/ESO ECO (monitoring and verification)	 During rehabilitation activities and prior to site closure.	 Rehabilitation plan/method statement.  Site inspection reports.  ECO close-out audit reports.  Photographic records

8.15.5 On completion of construction, the areas shall be cleared of any contaminated soil, which must be disposed of as per the waste management plan, which must be provided in the environmental file.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 During rehabilitation activities and prior to site closure.	 Rehabilitation plan/method statement.  Site inspection reports.  ECO close-out audit report.  Photographic records
8.15.6 Waste material of any description, including receptacles, scrap, construction waste rubble, and tires, will be removed entirely from the area and disposed of at a registered waste disposal facility. It will not be permitted to be buried or burned on the site.		X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Throughout the construction period and during site rehabilitation/closure.  Regular inspections of the construction footprint to identify and remove waste materials.	 Waste management plan.  Waste registers.  Registered landfill receipts/weighbridge tickets.  Site inspection reports.  ECO close-out audit report.
8.15.7 Proliferation of alien and invasive species is expected in disturbed areas, particularly as these species are already noted to be present within the study site. An alien and invasive management plan should be drafted and implemented.	X	X		 Contractor  EO/ESO  ECO (monitoring and verification)	 Prior to commencement of construction activities or when the need for management is identified.  Throughout the construction and rehabilitation periods.  Regular monitoring of disturbed areas for alien and invasive species establishment.	 Alien and invasive species management plan.  Alien species monitoring records.  Site inspection reports  Photographic records of affected areas and control activities.  ECO close-out audit report.

8.15.8 Alien and invasive species monitoring and eradication must take place quarterly and continue for one year after the completion of the development.	X	X	X	 Contractor ECO (monitoring and verification)	 Quarterly monitoring during the construction and post-construction period.  Monitoring and eradication activities must continue for at least one year after completion of the development.	 Alien and invasive species monitoring reports.  Eradication/control activity records.  Site inspection reports.  Photographic records of affected areas and control activities.  ECO close-out audit report.
8.15.9 Complete earthworks and seeding within 30 days of practical completion.		X	X	 Contractor ECO (monitoring and verification)	 Upon practical completion of construction activities. • Earthworks and seeding to be completed within 30 days after the relevant area becomes available for rehabilitation. • Regular monitoring of rehabilitation progress during the 30-day period.	 Rehabilitation plan/method statement.  Site inspection reports.  Photographic records of affected areas and control activities.  ECO close-out audit report.
8.15.10 At least 80% vegetative cover should be achieved on all rehabilitated surfaces within 1 year of completion of construction, with a preference for indigenous species dominance.		X	X	 Contractor ECO (monitoring and verification)	 During rehabilitation and throughout the first year following	 Rehabilitation monitoring reports.  Vegetation assessment records.  Site inspection reports.

					 completion of construction.  Regular monitoring of rehabilitated areas to assess vegetation establishment and species composition.  Corrective rehabilitation measures to be implemented where vegetation cover targets are not achieved.	 ECO audit reports.
8.15.11 If a reasonable assessment indicates that the re-establishment of vegetation is unacceptably slow, there may be a need for the soil to be analysed and any deleterious effects on the soil arising from the construction operation to be corrected, and the area to be seeded with a seed mix to the EAP's specifications.		X	X	 Contractor  ECO (monitoring and verification)	 During rehabilitation monitoring and within the first year following completion of construction.  Assessment of vegetation establishment progress at regular intervals.  Soil analysis to be undertaken where poor vegetation establishment is identified.  Implementation of soil	 Rehabilitation monitoring reports.  Soil analysis reports.  Corrective rehabilitation plans.  Seed mix specifications and application records.  Site inspection reports.  ECO audit reports.

					remediation and reseeding measures where required.	
Comments:						

9. METHOD STATEMENTS:

The Contractor shall submit written Method Statements for all environmentally sensitive aspects of the work. It should be noted that Method Statements must contain sufficient information and detail to mitigate the potential environmental impacts of the works. The Contractor will also need to thoroughly understand what is required of him / her in order to undertake the works. Work shall not commence until Method Statements have been put in place.

APPENDIX A – EAP CV



ENVIRONMENTAL MANAGEMENT GROUP

Specialists in Environmental Management
Integrating Industry and Infrastructure with the Environment

Tel: +27 51 412 6350
Fax: +27 51 412 6351
Email: ckruger@envmgrp.com
Postal Address:
P.O.Box 37473,
Langenhoven Park 9330

CURRICULUM VITAE

C.W. Vermeulen

Director, Avifauna Specialist and Senior Environmental Assessment Practitioner

Personal Information

ID: 9001015150088
Nationality: South African
Gender: Male
Health: Excellent
Vehicle License: Code B
Language: English/Afrikaans
Contact number: 082 824 9308
Email: cwv@envmgrp.com

Skills and Responsibilities

- Project Management
- Finance Management
- Review of EIA's, BAR's, Mining Permits and Mining Rights.
- Conduct Specialist Avifauna and Ecological Assessments.
- Use of Geographical Information Systems;
- Conduct Environmental Impact Assessments and other Environmental Technical Investigations;
- Apply and obtain, water licenses, mining permits and environmental authorisations for clients;
- Use different GIS datasets in order to create new information or investigate patterns for projects;
- Conduct environmental compliance and other environmental audits;
- Microsoft Office and Planet GIS.

Professional Experience

Employment History

Date	01/05/2017 - Present
Organisation	Environmental Management Group
Position	Director, Avifauna Specialist and Senior Environmental Assessment Practitioner
Duties and Responsibilities	Review all documentation associated with environmental Impact assessments, Financial Manager, Project Management, Conducting specialist Faunal and Avifaunal assessments. Applying for Water Use Licenses. Mining Rights and Permits, GIS Mapping. Environmental Impact Assessments, Environmental Compliance, Environmental Monitoring and Auditing. Composing and implementing Rehabilitation Plans.

Environmental Management Group Pty (Ltd) Reg. No. 2017/077689/07 VAT Reg No: 4350278778
Managing Director: S. van Rooyen | 083 678 3032 | svr@envmgrp.com
Director: C.W. Vermeulen | 082 824 9308 | cwv@envmgrp.com





ENVIRONMENTAL MANAGEMENT GROUP

Specialists in Environmental Management
Integrating Industry and Infrastructure with the Environment

Tel: +27 51 412 6350
Fax: +27 51 412 6351
Email: ckruger@envmgrp.com
Postal Address:
P.O.Box 37473,
Langenhoven Park 9330

Date	01/08/2016 – 31/04/2017
Organisation	Terra Works
Position	Environmental Assessment Practitioner, Environmental Specialist (Fauna and Avifauna), Water Use License Application Consultant, General Environmental Consultant.
Duties and Responsibilities	Conducting specialist Faunal and Avifaunal assessments. Applying for Water Use Licenses. GIS Mapping.

Date	30/03/2016 – 01/08/2016
Organisation	Bokamoso Environmental
Position	Environmental Specialist (Fauna and Avifauna), Water Use License Application Consultant, General Environmental Consultant.
Duties and Responsibilities	Conducting specialist Faunal and Avifaunal assessments. Applying for Water Use Licenses. GIS Mapping.

Date	01/04/2015 – 28/03/2016
Organisation	Hilland Environmental
Position	Junior Environmental Assessment Practitioner and Environmental Specialist (Avifauna)
Duties and Responsibilities	Junior Environmental assessment Practitioner, Conducting faunal and floral Specialist Assessments, Environmental Impact Assessments, Environmental Compliance, Environmental Monitoring and Auditing. Composing and implementing Rehabilitation Plans.

Date	30/01/2015 – 30/03/2015
Organisation	Zantow Environmental
Position	Environmental Specialist Consultant (Alien and Invasive Flora)
Duties and Responsibilities	Conducting specialist assessments concerning alien and invasive flora.

Date	05/06/2009 – 15/12/2010
Organisation	Kruger's Game Reserve
Position	Assistant Game Manager
Duties and Responsibilities	Game capturing, Grazing capacity evaluations, Assisting with lion breeding project.

EMG

Environmental Management Group Pty (Ltd) Reg. No. 2017/077689/07 VAT Reg No: 4350278778
Managing Director: S. van Rooyen | 083 678 3032 | svr@envmgrp.com
Director: C.W. Vermeulen | 082 824 9308 | cwv@envmgrp.com





ENVIRONMENTAL MANAGEMENT GROUP

Specialists in Environmental Management
Integrating Industry and Infrastructure with the Environment

Tel: +27 51 412 6350
Fax: +27 51 412 6351
Email: ckruger@envmgrp.com
Postal Address:
P.O.Box 37473,
Langenhoven Park 9330

Education

Institution	Degree(s) or Diploma(s) obtained
North West University, Potchefstroom 2010 – 2014	B.Sc. Environmental and Biological Sciences

Work Experience (Specialist Avifauna Assessments)

Date	Client	Project Name	Scope
April 2016	Bokamoso Environmental Consultants	Clubview Extension 92 (Mixed Use Development), Johannesburg, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Fairview Interchange Development, Johannesburg, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Knoppieslaagte Portion 331,109,105 Mixed Use Development, Pretoria, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Knoppieslaagte Portion 73 Mixed Use Development, Pretoria, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Waterval 38 IR Residential Development, Randburg, Gauteng	Scoping and EIA phase Avifauna Assessment
February 2016	Bokamoso Environmental Consultants	Lanseria Extension 66 Mixed Use Development, Pretoria, Gauteng	Scoping and EIA phase Avifauna Assessment
March 2016	Bokamoso Environmental Consultants	Lanseria Extension 51 Mixed Use Development, Pretoria, Gauteng	Scoping and EIA phase Avifauna Assessment
February 2016	Bokamoso Environmental Consultants	Lanseria Extension 65 Mixed Use Development, Pretoria, Gauteng	Scoping and EIA phase Avifauna Assessment
February 2016	Bokamoso Environmental Consultants	Lanseria Extension 65 Filling Station Development, Pretoria, Gauteng	Scoping and EIA phase Avifauna Assessment
March 2016	Bokamoso Environmental Consultants	Lanseria Extension 53 Township Development, Pretoria, Gauteng	Scoping and EIA phase Avifauna Assessment
March 2016	Bokamoso Environmental Consultants	Leeuwpoot 113 IR Residential Development, Boksburg, Gauteng	Scoping and EIA phase Avifauna Assessment

Environmental Management Group Pty (Ltd) Reg. No. 2017/077689/07 VAT Reg No: 4350278778
Managing Director: S. van Rooyen | 083 678 3032 | svr@envmgrp.com
Director: C.W. Vermeulen | 082 824 9308 | cwv@envmgrp.com





ENVIRONMENTAL MANAGEMENT GROUP

Specialists in Environmental Management
Integrating Industry and Infrastructure with the Environment

Tel: +27 51 412 6350
Fax: +27 51 412 6351
Email: ckruger@envmgrp.com
Postal Address:
P.O.Box 37473,
Langenhoven Park 9330

March 2016	Bokamoso Environmental Consultants	Leeuwpoot 113 IR Mixed Use Development, Boksburg, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Waterval 5-IR Commercial Township Development, Midrand, Gauteng	Scoping and EIA phase Avifauna Assessment
March 2016	Bokamoso Environmental Consultants	Watervall 5-IR Mixed Use Development, Midrand, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Portion 23,162,196 of Nootgedacht 534 JQ Mixed Use Development, Muldersdrift Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Portion 237 of Daspoort 319-JR, Residential Development, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	PWV 17 – Development of a 25 km National Road, Pretoria, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Portion 7 of Steelpoortdrift 365 KT Commercial Township Development, Midrand, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Portion 7 of Mooiplaats 355-JR, Mixed Use Development, Sunderland Ridge, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Portion 3 of Onbekend 398-JR, Shooting Range Development, Bapsfontein, Gauteng	Scoping and EIA phase Avifauna Assessment
April 2016	Bokamoso Environmental Consultants	Winterveld Agricultural Holdings Extension 1 & 5, Upgrading and Redevelopment of Winterveld extension 1 & 5, Brits, Gauteng	Scoping and EIA phase Avifauna Assessment
September 2017	Eco-con Environmental	Zulanie 167 – Agricultural Development, Douglas, Northern Cape	Scoping and EIA phase Avifauna Assessment & In-depth White-backed Vulture Impact Assessment
September 2017	Eco-con Environmental	Lorraine 100 - Agricultural Development, Douglas, Northern Cape	Scoping and EIA phase Avifauna Assessment & In-depth White-backed

Environmental Management Group Pty (Ltd) Reg. No. 2017/077689/07 VAT Reg No: 4350278778
Managing Director: S. van Rooyen | 083 678 3032 | svr@envmgrp.com
Director: C.W. Vermeulen | 082 824 9308 | cwv@envmgrp.com





ENVIRONMENTAL MANAGEMENT GROUP

Specialists in Environmental Management
Integrating Industry and Infrastructure with the Environment

Tel: +27 51 412 6350
Fax: +27 51 412 6351
Email: ckruger@envmgrp.com
Postal Address:
P.O.Box 37473,
Langenhoven Park 9330

September 2017	Eco-con Environmental	Banks Drift 164 & Portion 1 of Christian's Drift 166, Douglas, Northern Cape	Vulture Impact Assessment Scoping and EIA phase Avifauna Assessment & In-depth White-backed Vulture Impact Assessment
----------------	-----------------------	--	--

Environmental Impact Assessment Projects

Type	Client	Project	Role
Waste	Metsimaholo Local Municipality	Scoping/EIA; WULA application for the development of a new landfill site in Sasolburg	Co-author and Review of reports
	Joe Morolong Local Municipality	Scoping/EIA application for the development of a new landfill site in Hotazel	Co-author and Review of reports
Mining Permits or Rights	Danoher Contracting (PTY) Ltd	Mining Right application for a gravel BP in Bloemfontein	Co-author and Review of reports
	Michael Gutter	Mining Permit in Theunissen, Free State Province	Co-author and Review of reports
	Department of Rural Development and Land Reform	Mining Permit application for a sandstone Quarry in Zastron	Co-author and Review of reports
Road Construction	Free State Department of Police, Roads and Transport	BAR/IWUL/Mining Permit applications/ECO for the Deneyville - Jim Fouché road rehabilitation	Co-author and Review of reports
	Free State Department of Police, Roads and Transport	BAR/IWUL/Mining Permit applications/ECO for the Deneyville - Heilbron road upgrading	Co-author and Review of reports
	Free State Department of Police, Roads and Transport	BAR/IWUL applications/ECO for the Schonkenville - Koppies road upgrading	Co-author and Review of reports
	SANRAL	BAR/IWUL/ECO applications for the N1 Section 16 road upgrade	Co-author and Review of reports

Environmental Management Group Pty (Ltd) Reg. No. 2017/077689/07 VAT Reg No: 4350278778
Managing Director: S. van Rooyen | 083 678 3032 | svr@envmgrp.com
Director: C.W. Vermeulen | 082 824 9308 | cwv@envmgrp.com





ENVIRONMENTAL MANAGEMENT GROUP

Specialists in Environmental Management
Integrating Industry and Infrastructure with the Environment

Tel: +27 51 412 6350
Fax: +27 51 412 6351
Email: ckruger@envmgrp.com
Postal Address:
P.O.Box 37473,
Langenhoven Park 9330

	SANRAL	ECO Periodic Maintenance on National Route N6 Sec 8 from Reddersburg (km 0.00) to Rustfontein (km37.8)	Co-author and Review of reports
	Department of Roads and Public Works, Northern Cape	BAR/IWUL/Mining Permit applications for the MR 938 Mamatwan road upgrade	Co-author and Review of reports
	Free State Department of Police, Roads and Transport	ECO for the internal road upgrades in Thumahole, Free State Province.	Co-author and Review of reports
	Department of Roads and Public Works, Northern Cape	Environmental Screening/BAR/IWUL/ DAFF Permit applications/ECO for the BK126 Magobing to Bathlars road upgrade.	Co-author and Review of reports
	Department of Roads and Public Works, Northern Cape	Environmental Screening/BAR/IWUL/ DAFF Permit applications/ECO for the Tsineng to Washington road upgrade.	Co-author and Review of reports
	Department of Roads and Public Works, Northern Cape	BAR/IWUL/ DAFF Permit applications/ECO for the Hotazel to Maipeng road upgrade.	Co-author and Review of reports
Infrastructure Developments	Amatola Water	IWUL application/ECO for the installation of a bulk water pipeline, Herschel	Co-author and Review of reports
	Maluti A Phofung Local Municipality	IWUL application/ECO for the installation of a bulk water pipeline, Kestell to Qwa Qwa	Co-author and Review of reports
	Dr. Ruth Segomotsi Mompoti District Municipality	BAR and IWUL applications for the upgrading of the Waste Water Treatment Works in Stella	Co-author and Review of reports
	Dr. Ruth Segomotsi Mompoti District Municipality	Environmental Screening/EMP/IWULA/ECO for the construction of a water provision project for the village of Reivilo, Shaleng, Madipelesa, Karelstad, Mothlako, Molelema, Lykso, Pitsong and Kameelputs, North-West Province.	Co-author and Review of reports
	Dr. Ruth Segomotsi Mompoti District Municipality	Environmental Screening/ EMP/IWULA/ECO for the construction of a water provision project for the village of Schweizer-reneke, Piet Plessis, Konke, Broedersput, Geduldspan, Louwna, Mabone and Maeng, North-West Province.	Co-author and Review of reports

Environmental Management Group Pty (Ltd) Reg. No. 2017/077689/07 VAT Reg No: 4350278778
Managing Director: S. van Rooyen | 083 678 3032 | svr@envmgrp.com
Director: C.W. Vermeulen | 082 824 9308 | cwv@envmgrp.com





ENVIRONMENTAL MANAGEMENT GROUP

Specialists in Environmental Management
Integrating Industry and Infrastructure with the Environment

Tel: +27 51 412 6350
Fax: +27 51 412 6351
Email: ckruger@envmgrp.com
Postal Address:
P.O.Box 37473,
Langenhoven Park 9330

	Department of Rural Development and Land Reform	Scoping EIA, WULA and Air Emission License for the development of a Brick factory in Thaba-Nchu	Co-author and Review of reports
	Dr. Ruth Segomotsi Mompoti District Municipality	Section 24G for the development of a pump station in the Wentzel Dam, Schweizer-reneke, North-West Province.	Co-author and Review of reports
	AURECON	ECO for the upgrading of 12 Bridges in the De Aar and Uptington Areas,	Co-author and Review of reports
	EUROMID AFRICA Development	EIA/Scoping/IWULA and ECO for MATJHABENG PRECINCT IDP PROJECT 201621, Free State Province.	Co-author and Review of reports
	Umfundu Professional Services CC.	IWULA and EIA/Scoping for the Mmamahabane cemetery establishment, Free State	Co-author and Review of reports
	LMV (PTY) LTD.	Environmental Screening for the school development in Maokeng (Kroonstad) - Erwe 1500 & 24628, Free State Province	Co-author and Review of reports
	AURECON	Environmental Screening/BAR/WULA/ECO for Lindley Water Treatment Works and Pipeline route, Free State Province	Co-author and Review of reports
	Matjhabeng Local Municipality	Environmental Impact Assessment - Mmamahabane Cemetery Development, Ventersburg, Free State	Co-author and Review of reports
	Matjhabeng Local Municipality	Environmental Impact Assessment- Matjhabeng Precinct IDP Project 201621, Welkom Free State	Co-author and Review of reports
Residential Developments	Greater Taung Local Municipality	BAR application for Boipela Residential Development Extension in Reivilo	Co-author and Review of reports
Agriculture	VS Kunsmis	Scoping/EIA application for expansion of storage of a dangerous good at Vrede	Co-author and Review of reports
	Linheim	BAR/ECO for the expansion of the Linheim Sheep Feedlot, Free State Province	Co-author and Review of reports
	Wildeklawer	BAR application for the expansion of pivot systems near Barkley West	Co-author and Review of reports

Environmental Management Group Pty (Ltd) Reg. No. 2017/077689/07 VAT Reg No: 4350278778
Managing Director: S. van Rooyen | 083 678 3032 | svr@envmgrp.com
Director: C.W. Vermeulen | 082 824 9308 | cwv@envmgrp.com





ENVIRONMENTAL MANAGEMENT GROUP

Specialists in Environmental Management
Integrating Industry and Infrastructure with the Environment

Tel: +27 51 412 6350
Fax: +27 51 412 6351
Email: ckruger@envmgrp.com
Postal Address:
P.O.Box 37473,
Langenhoven Park 9330

Department of Rural Development and Land Reform	Environmental Screening/BAR and WULA application for the development of an Agri-Park in Parys, Free State	Co-author and Review of reports
Department of Rural Development and Land Reform	Environmental Screening/S24G and WULA application for the development of an Agri-Park in Springfontein, Free State	Co-author and Review of reports
Department of Rural Development and Land Reform	S24G and WULA application for the development of an Agri-Park in Thaba-Nchu, Free State	Co-author and Review of reports
Department of Rural Development and Land Reform	Environmental Screening for the development of an Agri-Park in Tsiamé, Free State	Co-author and Review of reports
Department of Rural Development and Land Reform	Environmental Screening/BAR and WULA application for the development of an Agri-Park in Wesselsbron, Free State	Co-author and Review of reports
Department of Rural Development and Land Reform	Environmental Screening/BAR and WULA application for the development of a Farmer Production Support Unit in Koffiefontein, Free State	Co-author and Review of reports
Department of Rural Development and Land Reform	Environmental Screening/BAR and WULA application for the development of a Farmer Production Support Unit in Odendalsrus, Free State	Co-author and Review of reports
Department of Rural Development and Land Reform	Environmental Screening for the development of a Farmer Production Support Unit in Sediba, Free State	Co-author and Review of reports
Department of Rural Development and Land Reform	Environmental Screening/BAR application for the development of a Farmer Production Support Unit in Kroonstad, Free State	Co-author and Review of reports

EMG

Environmental Management Group Pty (Ltd) Reg. No. 2017/077689/07 VAT Reg No: 4350278778
Managing Director: S. van Rooyen | 083 678 3032 | svr@envmgrp.com
Director: C.W. Vermeulen | 082 824 9308 | cwv@envmgrp.com



**Environmental Assessment
Practitioners Association
of South Africa**



Registration No. 2019/1521

Herewith certifies that

CW VERMEULEN

is registered as an

Environmental Assessment Practitioner

**Registered in accordance with the prescribed criteria of Regulation 15. (1)
of the Section 24H Registration Authority Regulations
(Regulation No. 849, Gazette No. 40154 of 22 July 2016, of the
National Environmental Management Act (NEMA), Act No. 107 of 1998, as amended).**

Effective: 01 April 2026

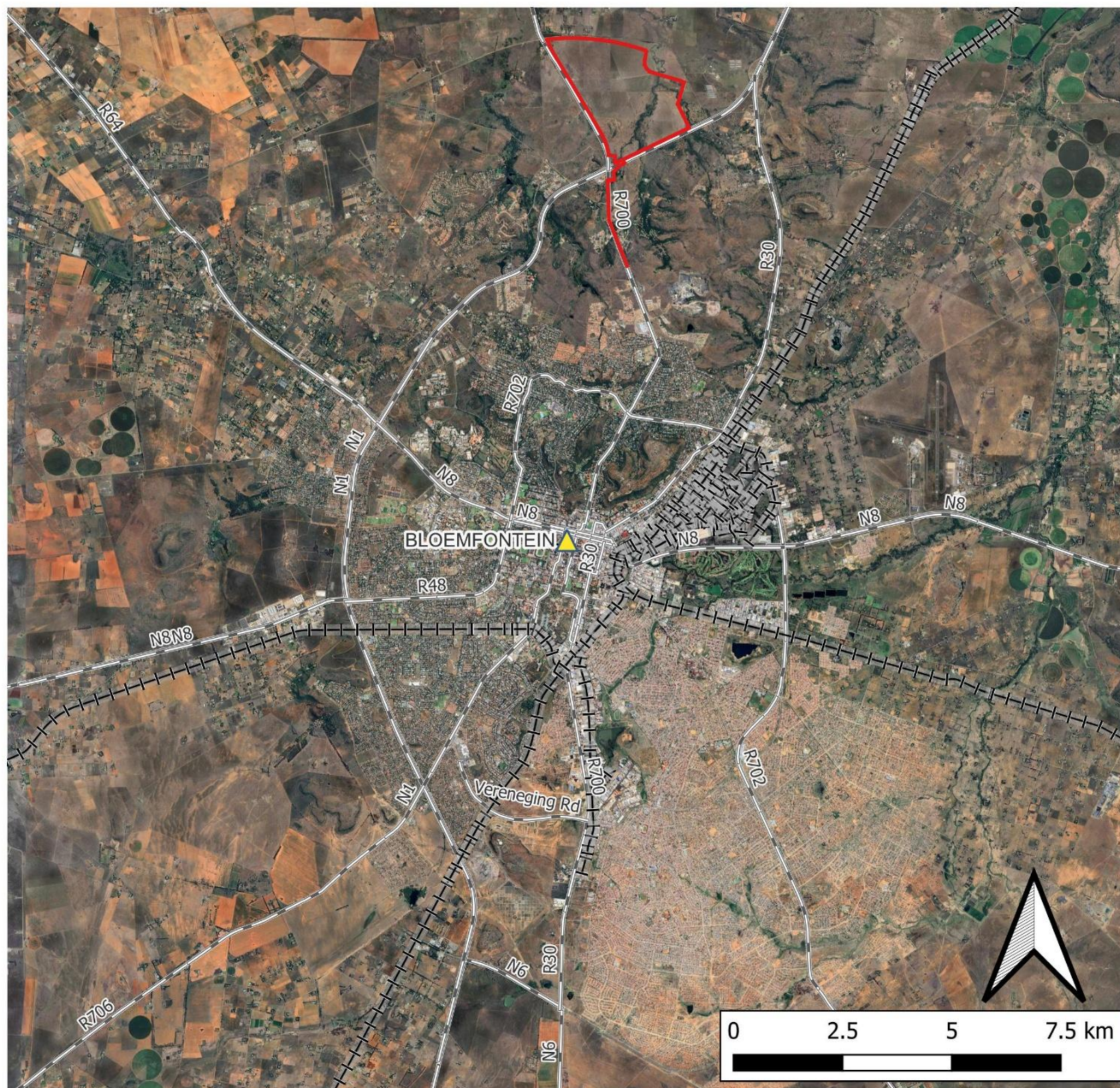
Expires: 31 March 2027

Chairperson

Registrar



APPENDIX B – MAPS



Locality Map



LEGEND

Infrastructure

Pipeline ———

Landmarks

Railways —+—+—+—

Cities and towns ▲

Roads ———

Geography

Local Municipality ■

Free State Province ■

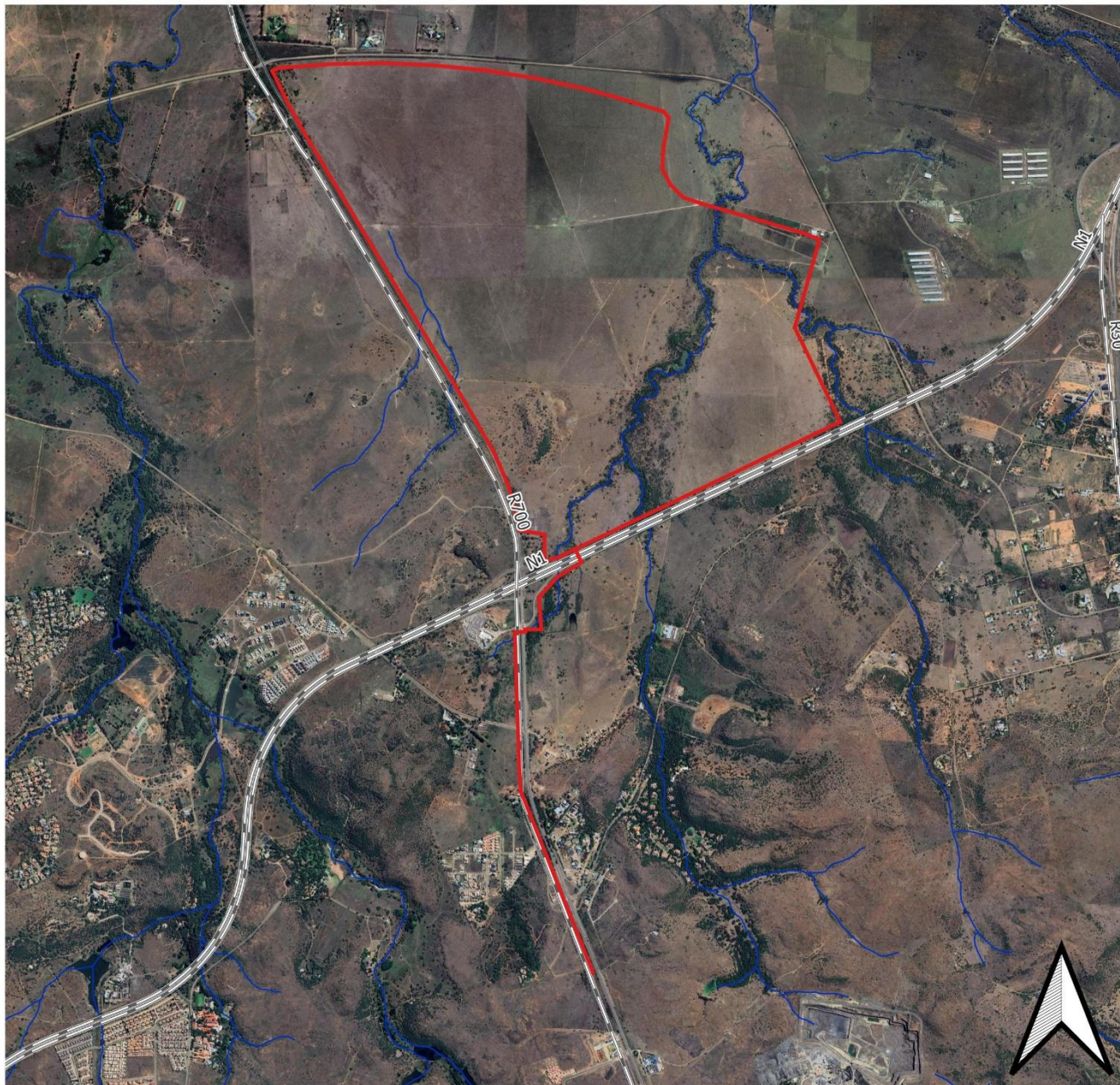
Scale: 1: 140000

Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Layout Map

LEGEND

Infrastructure

Pipeline —

Landmarks

Roads —

Aquatic

DWS Rivers —

Scale: 1:35000

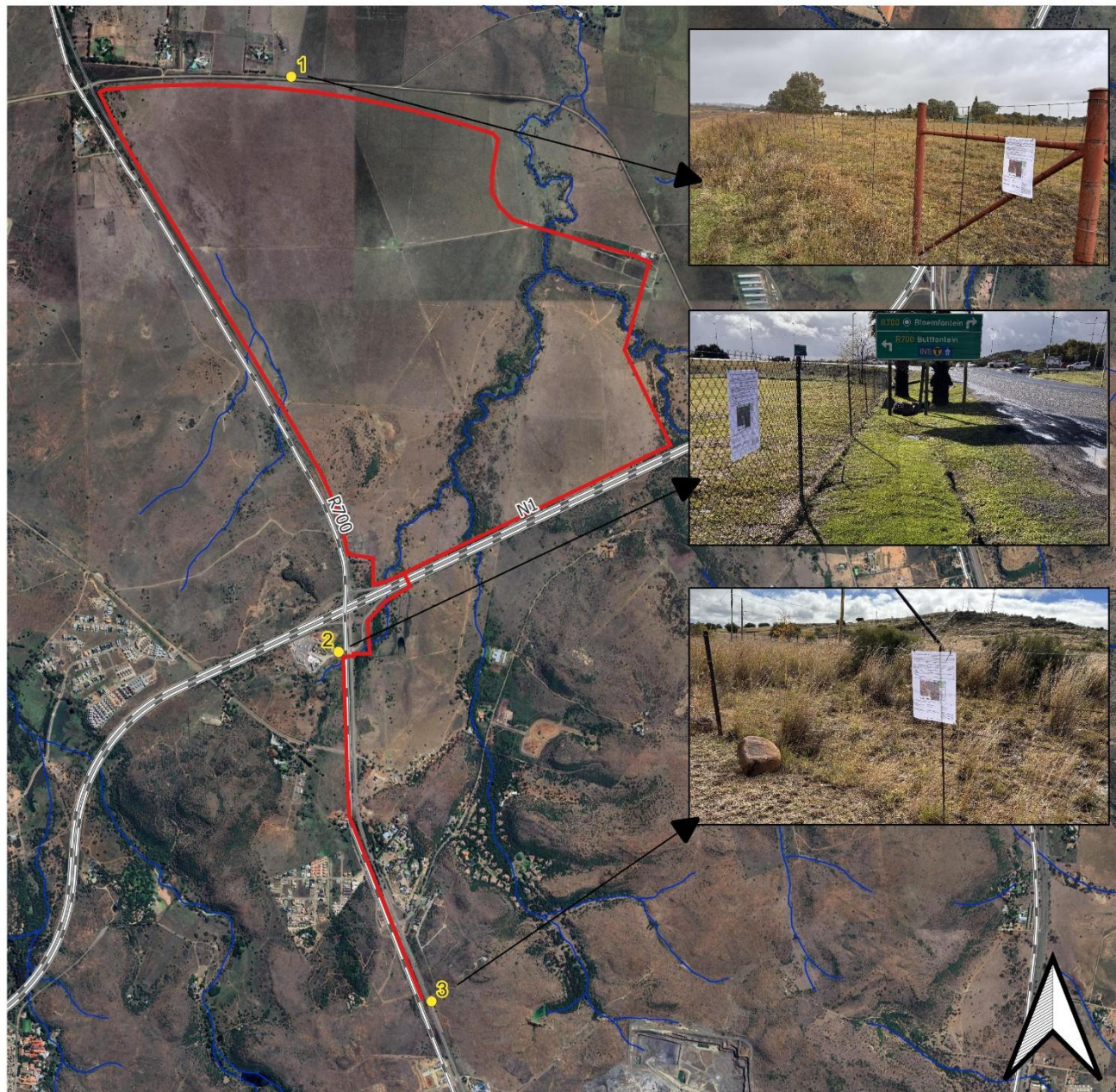
0 500 1 000 1 500 m

Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Site Notice Map

LEGEND

Infrastructure

Site notices 

Pipeline 

Landmarks

Railways 

Cities and towns 

Roads 

Aquatic

DWS Rivers 

Scale: 1:35000

0 500 1 000 1 500 m

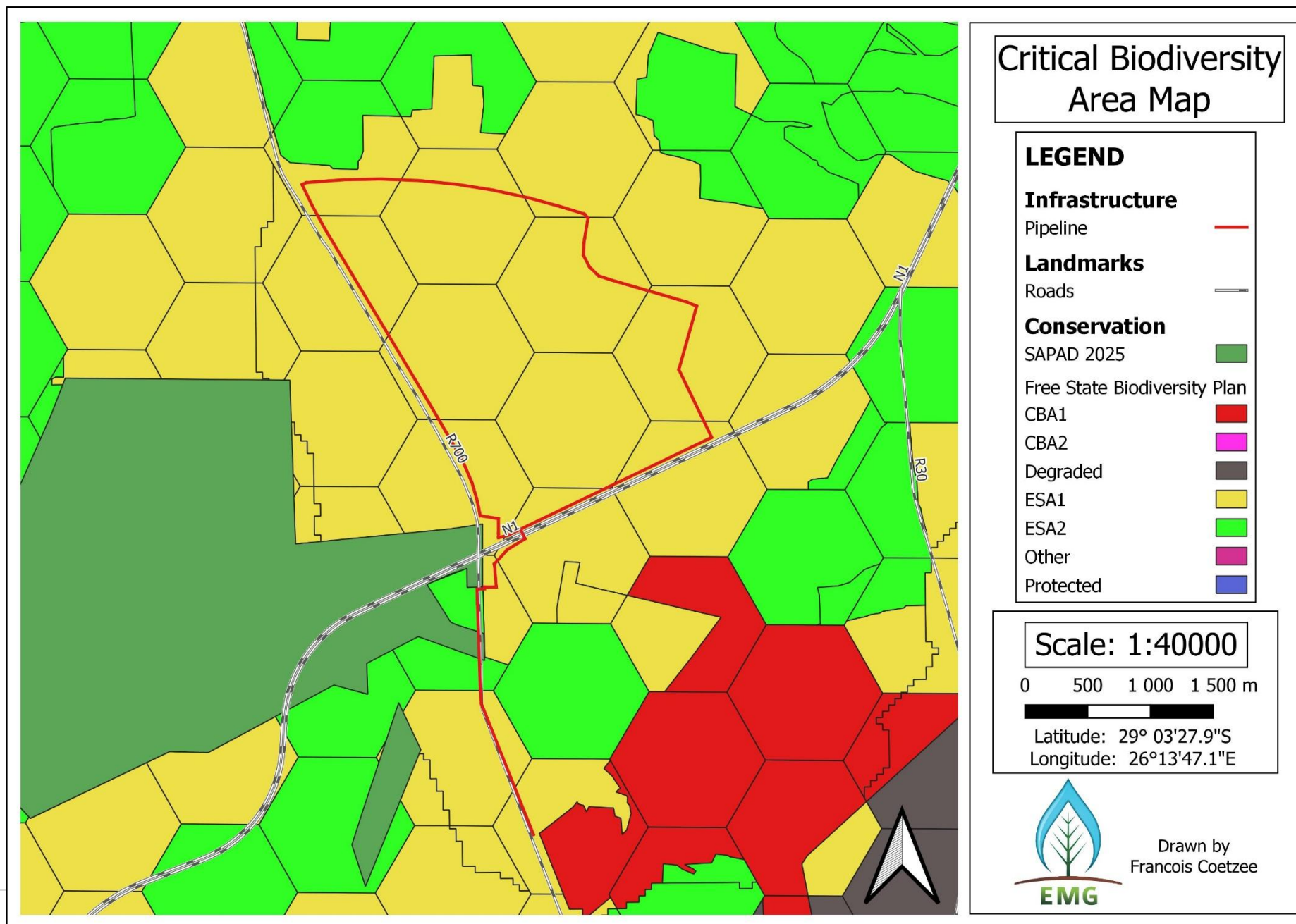


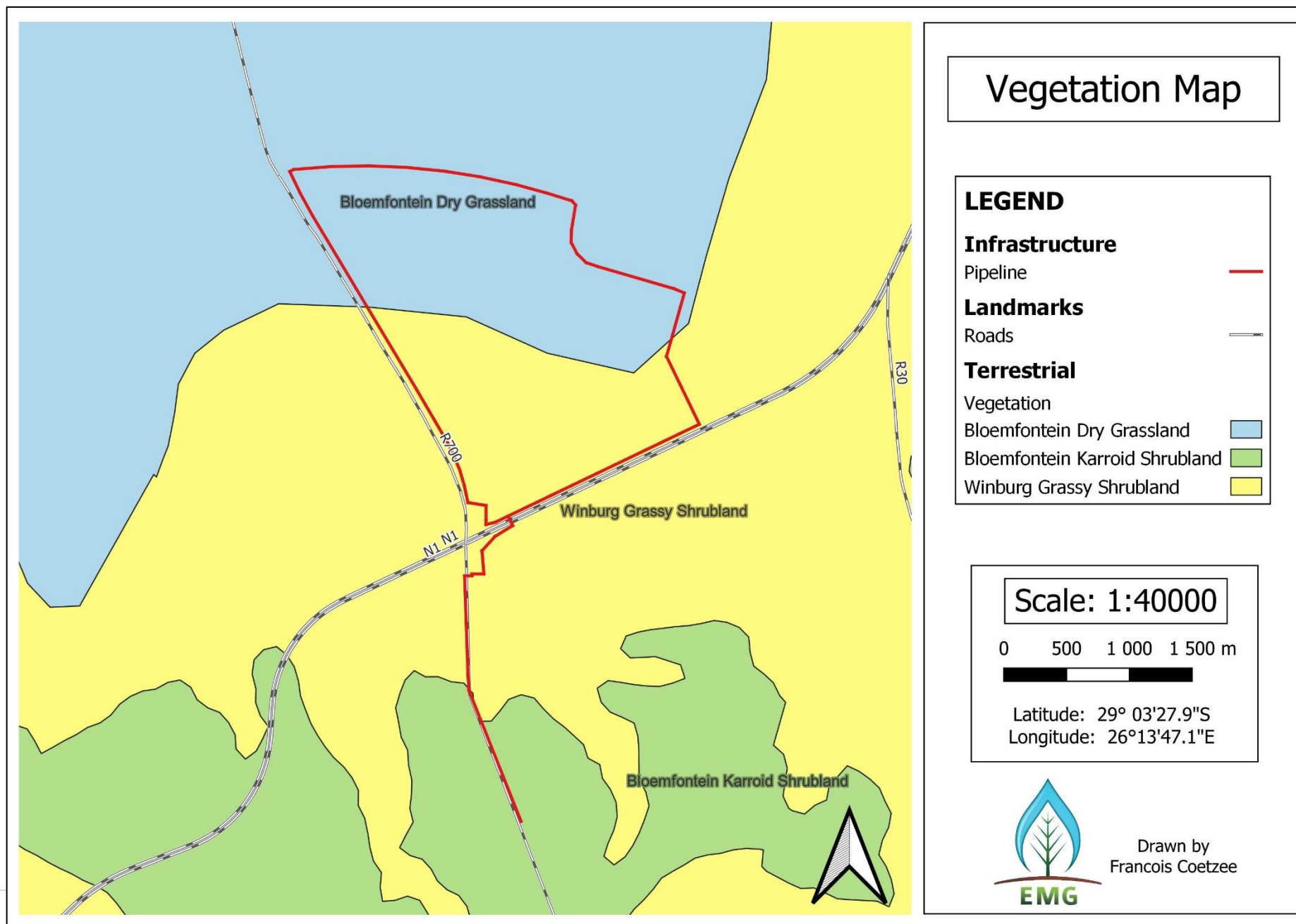
Latitude: 29° 03'27.9"S

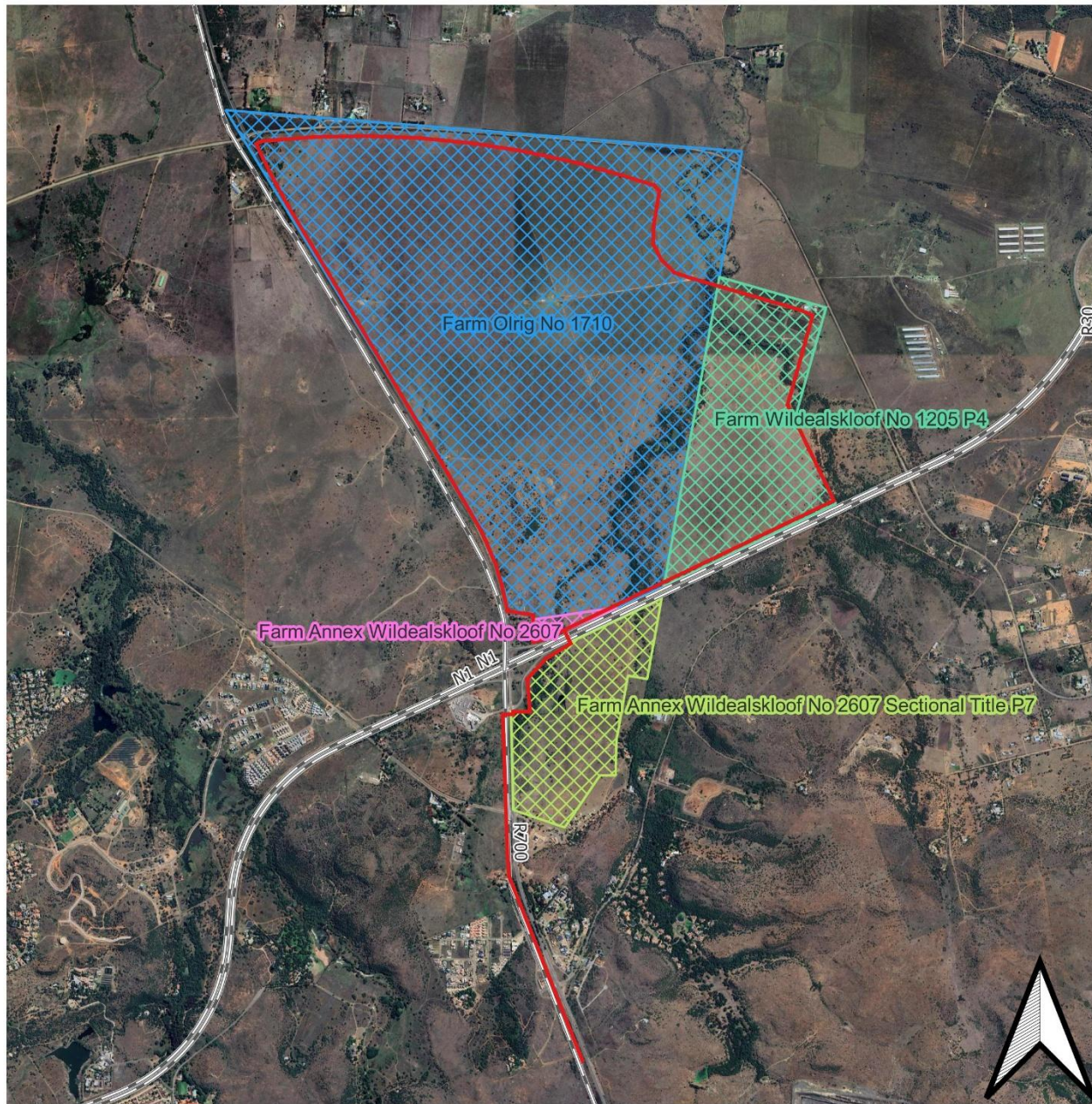
Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee







Affected Properties Map

LEGEND

Infrastructure

Pipeline



Landmarks

Railways



Cities and towns



Roads



Landowners

Affected Properties

Farm Annex Wildealskloof No 2607



Farm Annex Wildealskloof No 2607



Sectional Title P7

Farm Olrig No 1710



Farm Wildealskloof No 1205 P4



Scale: 1:35000

0 500 1 000 1 500 m

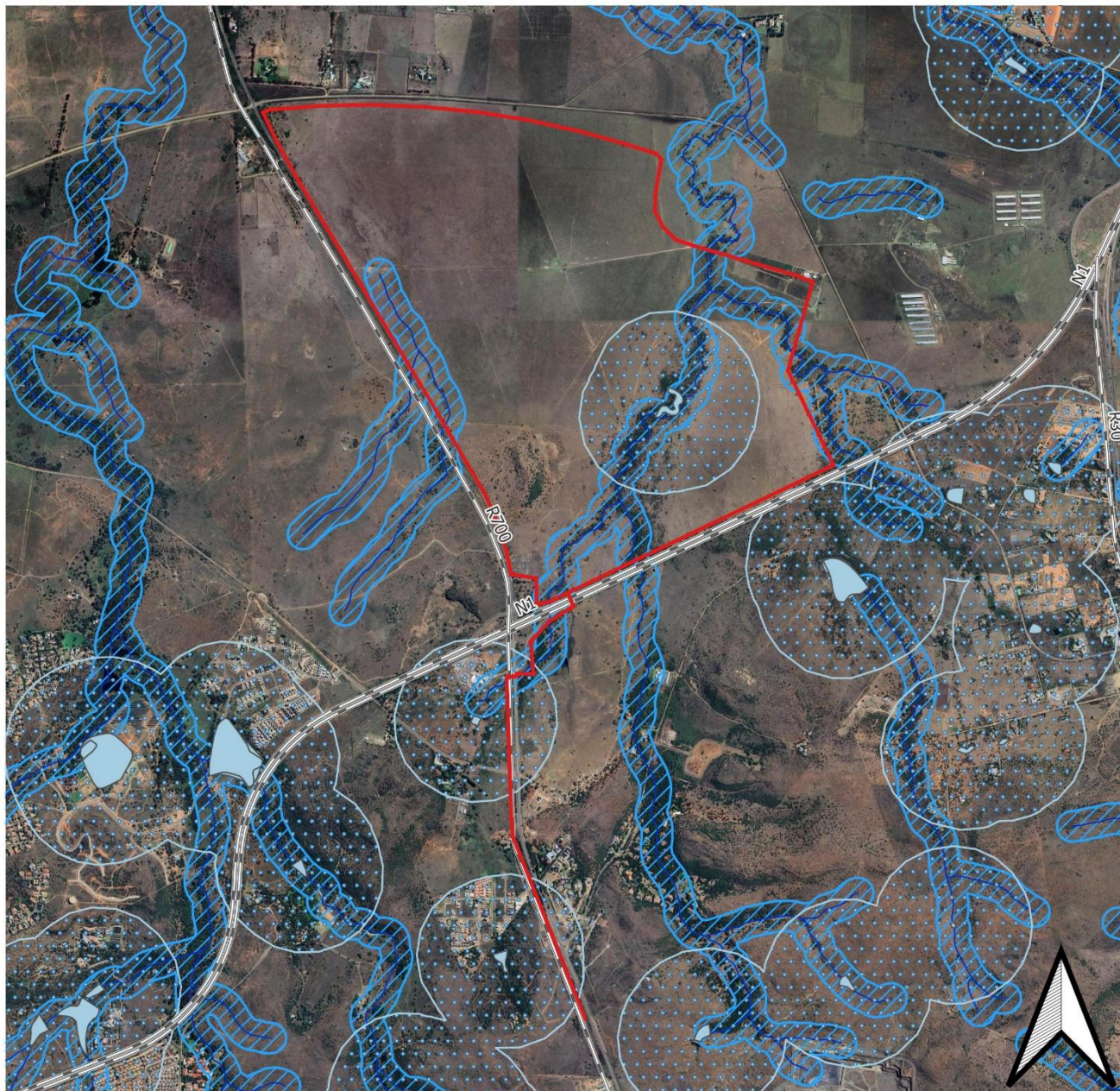


Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Aquatic Map

LEGEND

Infrastructure

Pipeline 

Landmarks

Roads 

Aquatic

Wetlands (NFEPA) 

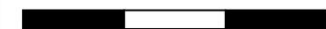
Wetlands 500 m regulated area (NFEPA) 

Rivers (DWS_50k) 

Rivers 100 m regulated area (DWS_50k) 

Scale: 1:35000

0 500 1 000 1 500 m

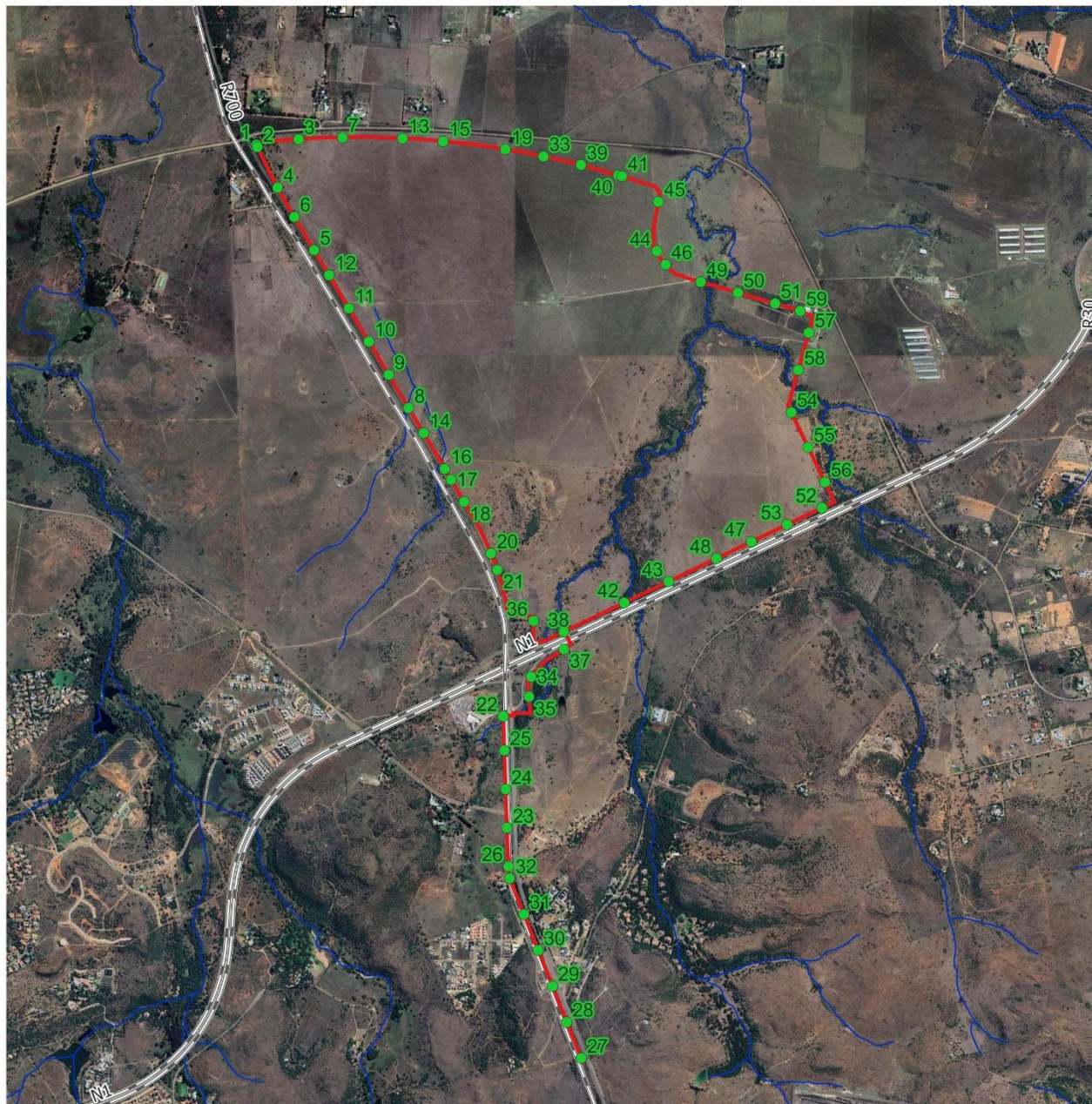


Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Coordinate Map

LEGEND

Infrastructure

250 m coordinates ●

Pipeline —

Landmarks

Railways —+—+—+—

Cities and towns ▲

Roads —

Aquatic

DWS Rivers —

Scale: 1:35000

0 500 1 000 1 500 m

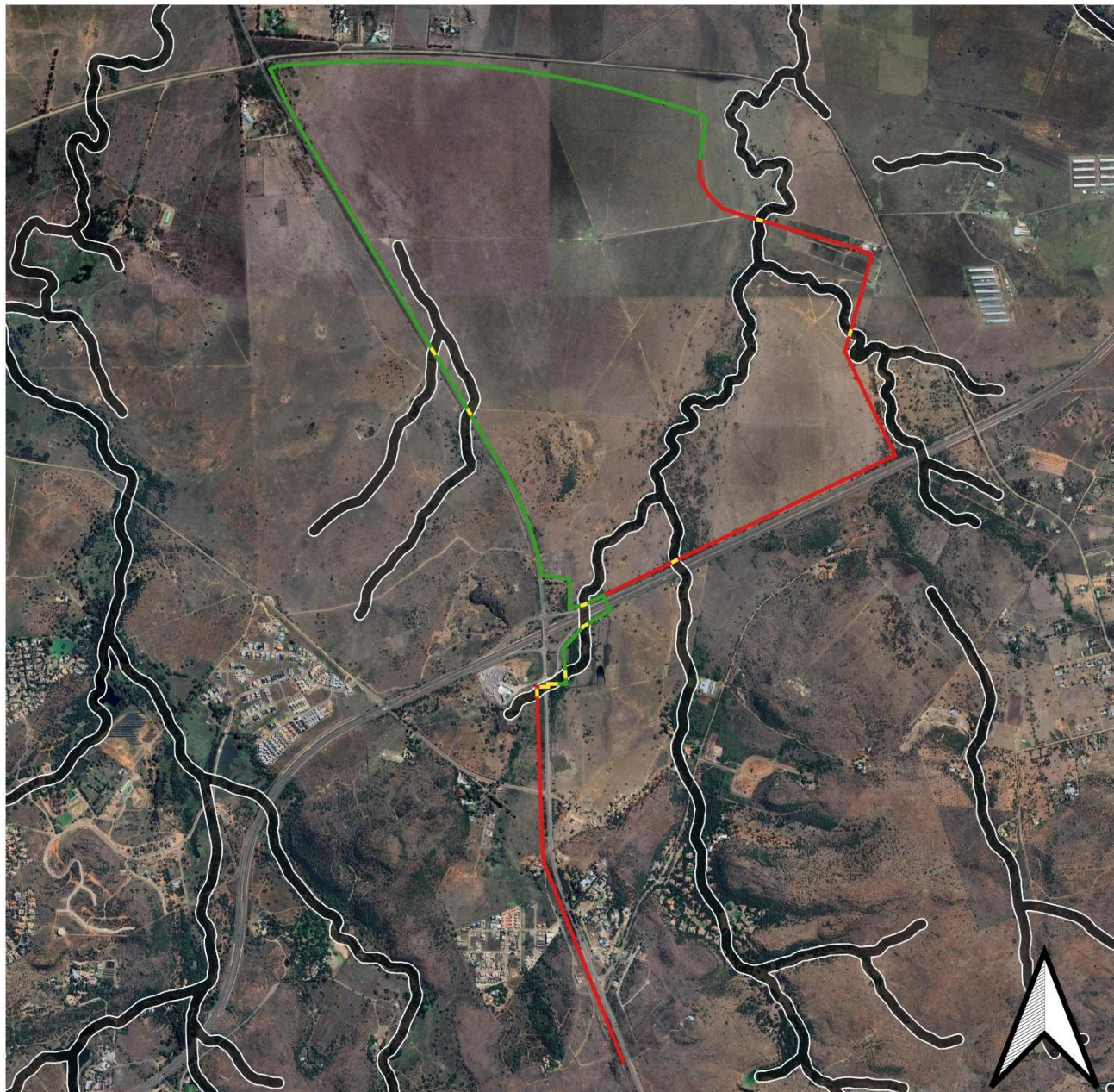


Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Listing Notice 1 triggers Map

LEGEND

Listing Notice 1 Triggers

Listing Notice 1 Activity 19

Listing Notice 1 Activity 9

Infrastructure

Pipeline

Aquatic

Rivers 32 m Regulated area
(DWS_50k)

Scale: 1:32000

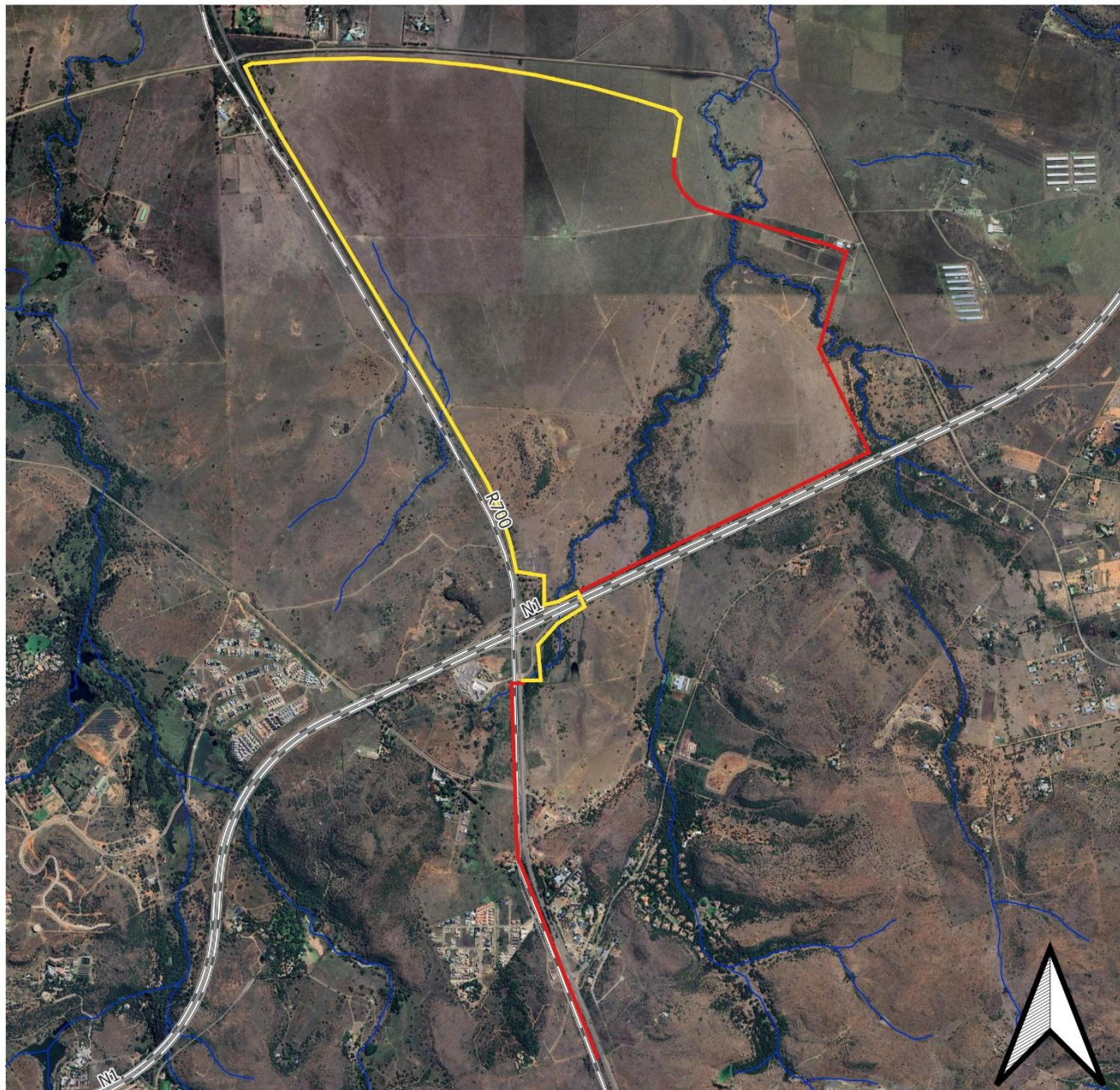
0 500 1 000 1 500 m

Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Listing Notice 1 Activity 9 Map

LEGEND

Listing Notice 1

Listing Notice 1 Activity 9 —

Infrastructure

Pipeline —

Landmarks

Roads —

Aquatic

Rivers (DWS_50k) —

Scale: 1:32000

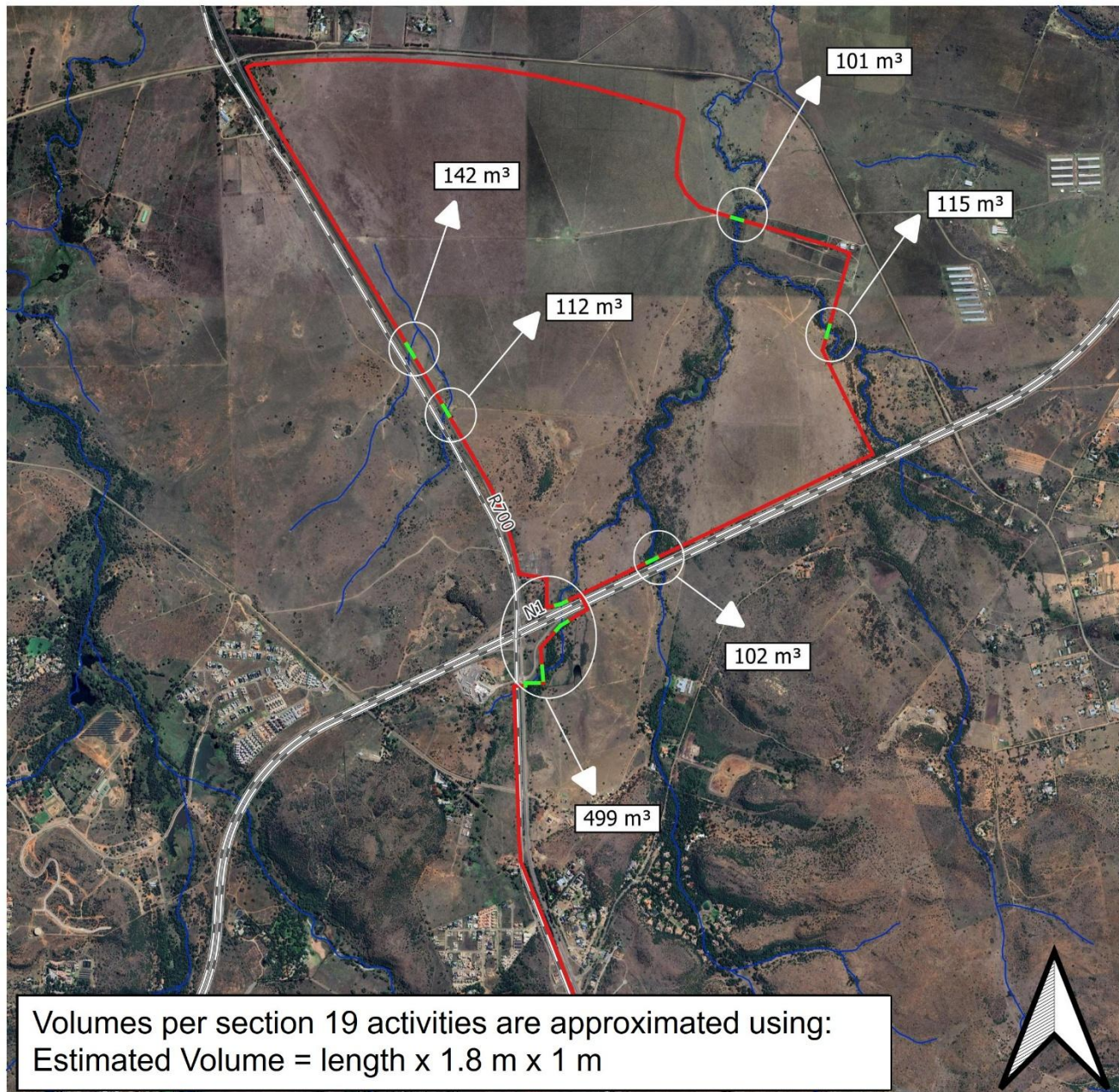
0 500 1 000 1 500 m

Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Listing Notice 1 Activity 19 Map

LEGEND

Listing Notice 1

Listing Notice 1 Activity 19 —

Infrastructure

Pipeline —

Landmarks

Roads —

Aquatic

Rivers (DWS_50k) —

Scale: 1:32000

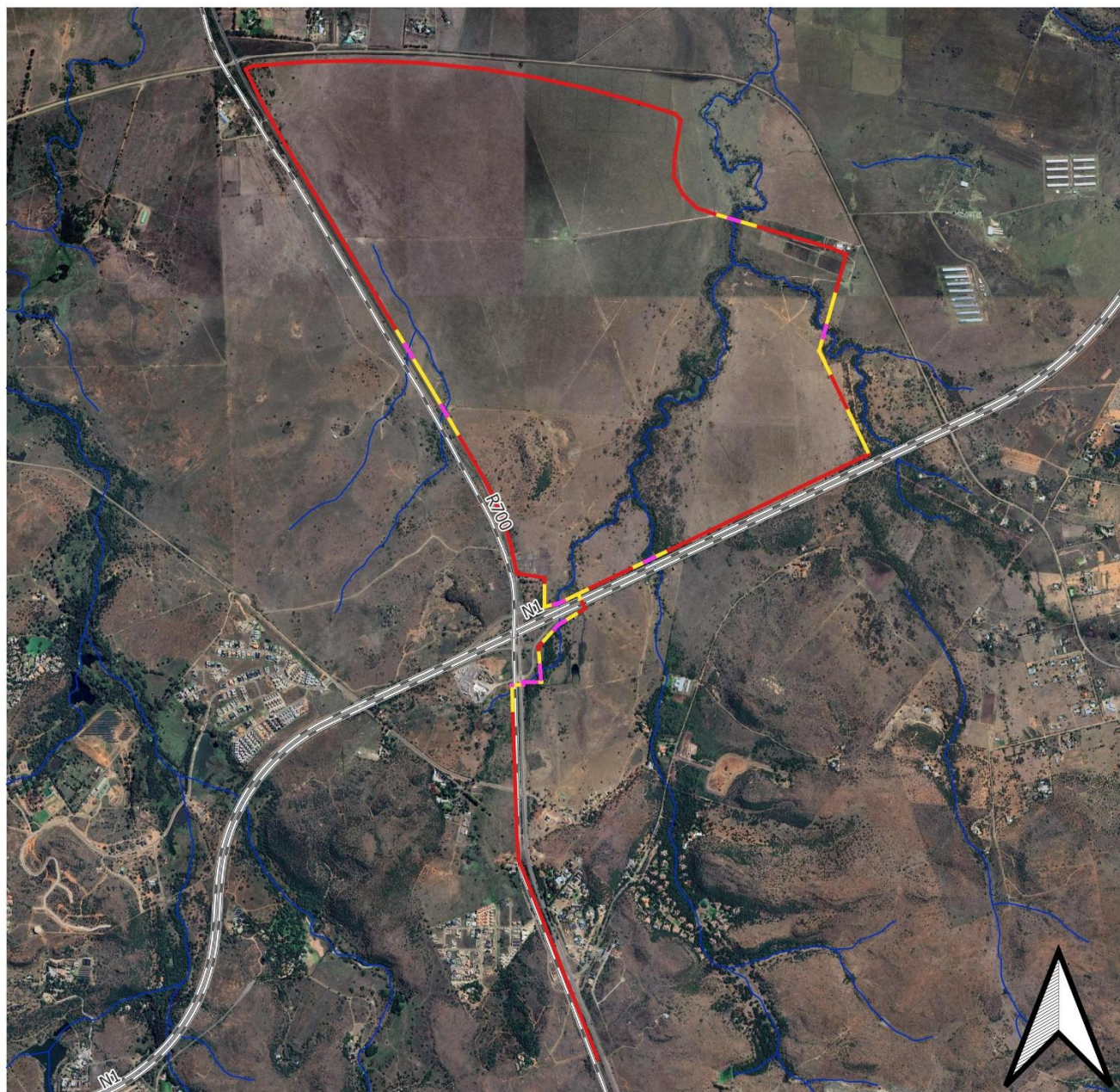
0 500 1 000 1 500 m

Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Listing Notice 3 Triggers Map

LEGEND

Listing Notice 3

Listing Notice 3 Activity 14

Listing Notice 3 Activity 12

Infrastructure

Pipeline

Landmarks

Roads

Aquatic

Rivers (DWS_50k)

Scale: 1:32000

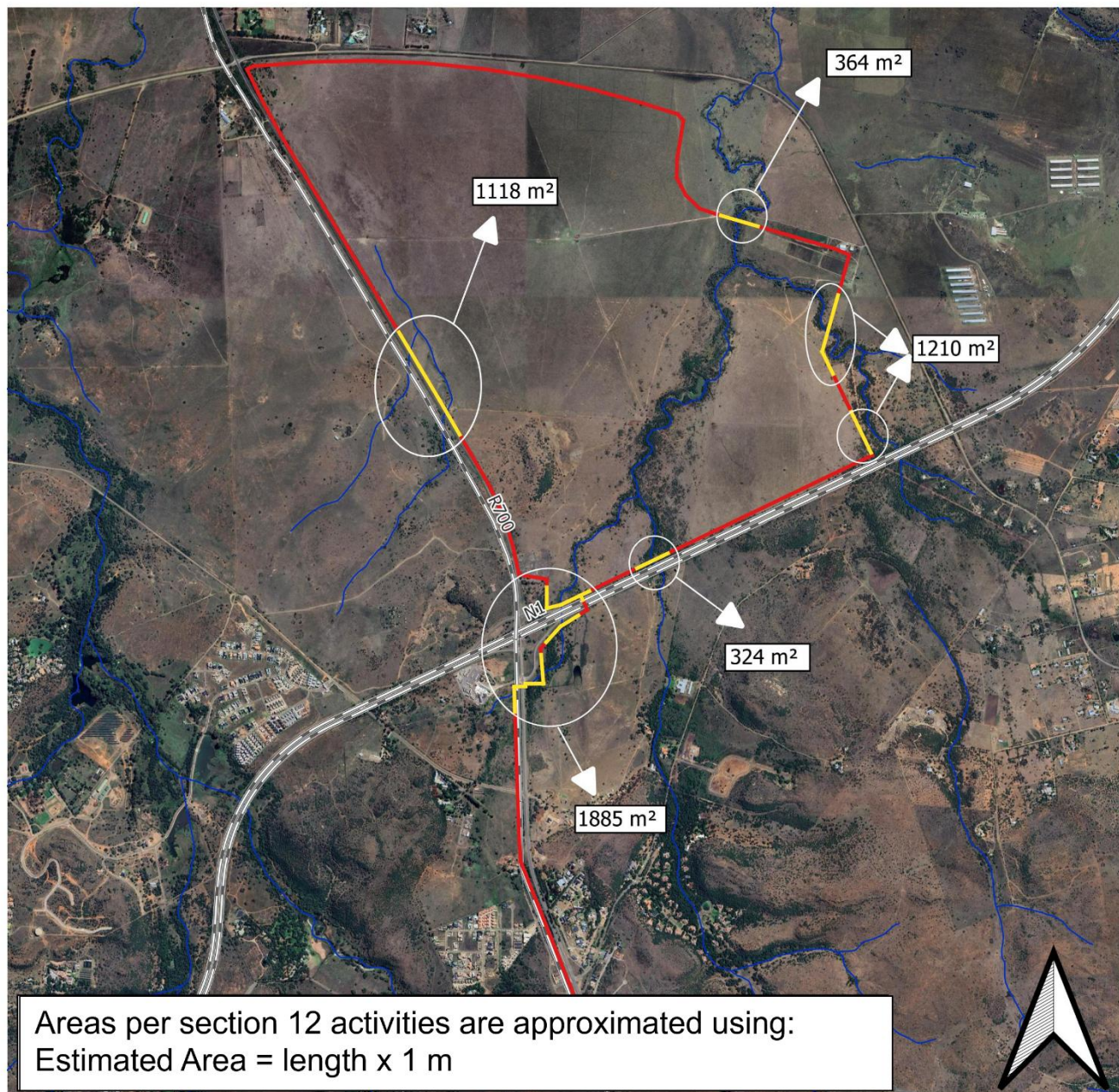
0 500 1 000 1 500 m

Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Listing Notice 3 Activity 12 Map

LEGEND

Listing Notice 3

Listing Notice 3 Activity 12 —

Infrastructure

Pipeline —

Landmarks

Roads —

Aquatic

Rivers (DWS_50k) —

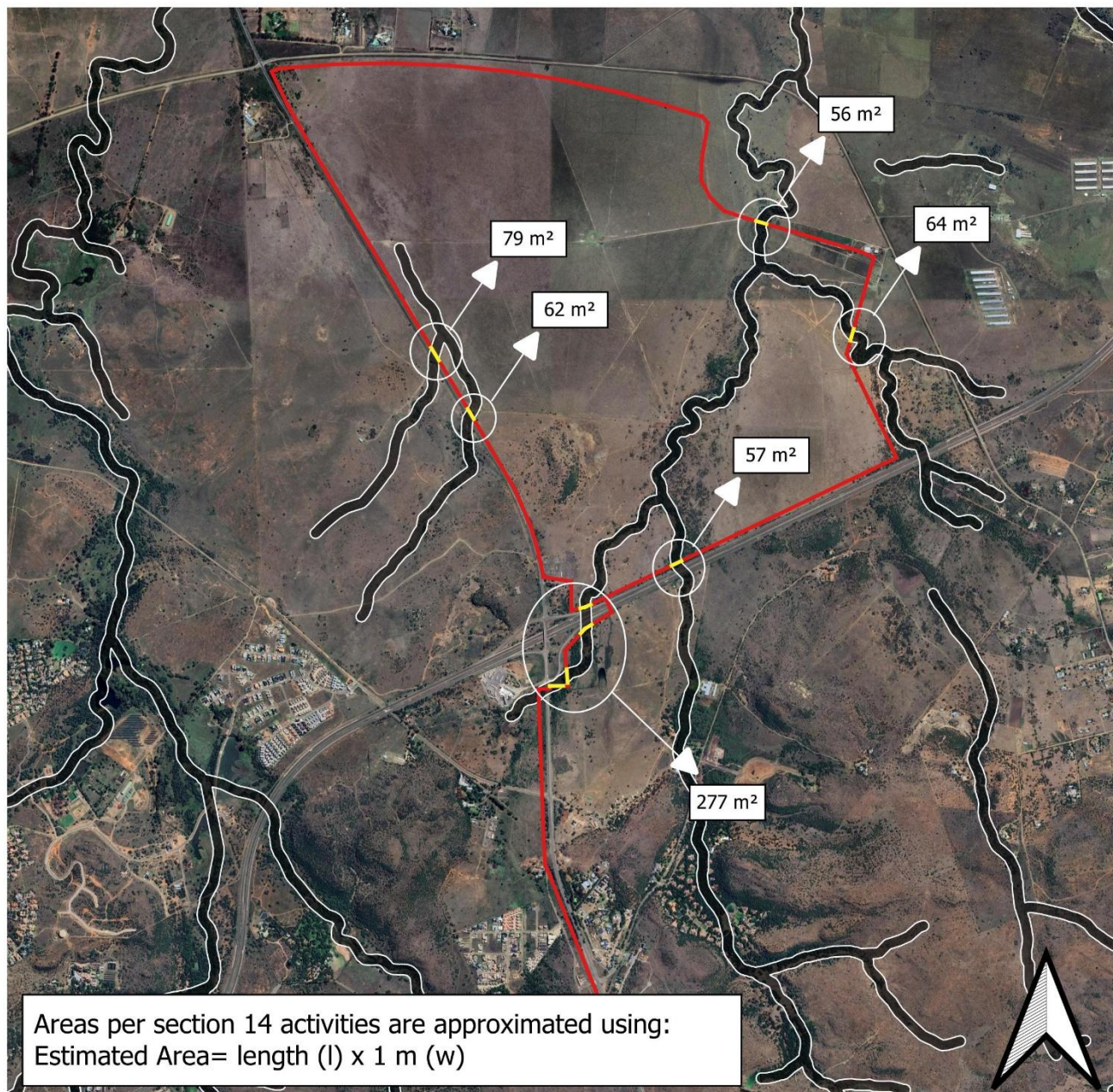
Scale: 1:32000

0 500 1 000 1 500 m

Latitude: 29° 03'27.9"S
Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee



Listing Notice 3 Activity 14 Map

LEGEND

Listing Notice 3 Triggers

Listing Notice 3 Activity 14

Infrastructure

Pipeline

Aquatic

Rivers 32 m Regulated area
(DWS_50k)

Scale: 1:32000

0 500 1 000 1 500 m

Latitude: 29° 03'27.9"S

Longitude: 26°13'47.1"E



Drawn by
Francois Coetzee

APPENDIX C – CHANCE FIND PROTOCOL

Identification of anomalous/irregular shapes or forms on the landscape or within rocks and unconsolidated sediments is a first step in recognising potential fossil remains or fossil-bearing landforms in the field.



Figure 5 Easily recognisable features likely indicative of fossil remains within Adelaide Subgroup sedimentary rocks may include fragmentary silicified wood resembling stone-like objects of variable size exhibiting concentric ring-like structures in distal or proximal view (far left), and fossil bones resembling odd-shaped, nodular or cylindrical, stone-like objects.

Easily noticeable fossil remains from freshly exposed sedimentary rocks in the region may resemble petrified wood fragments of variable size that usually exhibit concentric ring-like structures or bones resembling odd-shaped, nodular, or cylindrical, stone-like objects (Fig. 5).



Figure 6: Surface concentrations of knapped lithic debitage and retouched flake tools (A)- including convergent flake-blades consistent with MSA typologies (B)- may signal deflated or shallowly capped in situ Stone Age occurrences. Localised surface scatters of glass, fragmented bone, and corroded metal artefacts are diagnostic of late 19th- to early 20th-century refuse middens associated with historical-period occupation. (C)- In the absence of formal headstones, unmarked burial sites are typically identified by low, tightly packed stone cairns or domed cobble coverings, surface features consistent with historically vernacular grave-marking traditions (D, E).

Archaeological remains that may be encountered in the project area include, but are not limited to, the following (Fig. 6): Stone Age lithic artefacts typically presenting as concentrations of knapped debitage, retouched flakes and convergent points consistent with reduction or knapping sites may occur on older, stable land surfaces beneath the aeolian sand cover and eluvial mantles, particularly in proximity to contact metamorphic zones where hornfels and indurated shale provided suitable raw material for stone tool manufacture. Surface scatters of glass, fragmented bone, and corroded ferrous metal are diagnostic of late 19th- to early 20th-century refuse middens associated with historical-period farmstead occupation. Unmarked burial sites, which may lack formal headstones, are typically identified by low, tightly packed stone cairns or domed cobble coverings consistent with vernacular grave-marking traditions in the region.

If material proves to be significant, a Phase 2 rescue operation may be required subject to permits issued by SAHRA. The decision regarding the EA Application must be communicated to SAHRA and uploaded to the SAHRIS Case application. In the meantime, excavated or removed remains must be wrapped in paper towels or heavy-duty tin foil and stored in a safe place.

The material should not be washed or cleaned in any way. Undisturbed material must be kept in place and protected from further damage by covering it with a light but rigid object, such as

a box, bucket, or metal sheet, if possible, and the area must be avoided by implementing a no-go buffer zone until further confirmation by a professional palaeontologist.